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CÆSAREAN SECTION: A SERIES OF THIRTEEN CASES.

By BERNARD DAWSON, M.D., F.R.C.S.,
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TEN years ago Professor Munro Kerr wrote:

Our art is ever progressing; at no period of its history has it been so virile as it is today. I am quite convinced that twenty years hence, when the youngest here have become seniors, the accepted indications for Cæsarean section will be extended even beyond the limits suggested in this paper.

The paper referred to was read and published at the same time as the famous Collective Investigation made by Munro Kerr and Eardley Holland.

Our attitude towards the operation has been for the past ten years influenced greatly by the deductions made from this investigation. It may be remembered that, with great industry, the investigators collected from thirty-two British hospitals records of 4,197 Cæsarean sections performed during the years 1911 to 1920. The value of this work cannot be over-estimated, but several factors must be considered.

1. The operations were performed by a large number of surgeons of very varied capacity.

2. Many of the cases were grave emergencies, the patients having been sent to public hospitals after misguided and futile attempts at vaginal delivery.

3. Antenatal supervision was at that time very scanty and occasional.

4. The period included the four years of the war, when all hospitals were understaffed and all honorary staffs much depleted.

It is therefore more than time that another survey was undertaken, for, without doubt, the results would prove to be a very great improvement upon those of the Collective Investigation. All obstetricians can recall cases of precarious vaginal delivery, often resulting in damage to mother and

child, that would have been better treated by a bolder attitude and the performance of Cæsarean section at an appropriate moment.

It is because I feel very strongly that our teaching and practice should have outgrown the criteria established by an investigation of operations performed twenty years ago that I have ventured to present my own small number of cases as an inadequate peg upon which to hang an advocacy, not necessarily of more Cæsarean sections, but rather of a wiser selection of both the patient and the time of operation.

The maternal mortality in cases of section for contracted pelvis arrived at by the Collective Investigators was 4·1%, but it is obvious, from more recent publications, that this figure is much lower today.

In 1928 Frances Ivens, of Liverpool, reported a series of 295 unselected cases with a mortality of 1·3%. In 1930 Thompson, of Los Angeles, reported a series of 212 with a mortality of 2·8% and several smaller series of 100 or less without any deaths.

Munro Kerr has remarked that:

> The scope of any surgical procedure or operation will always extend as the technique is improved and the mortality and morbidity reduced.

It is becoming increasingly clear that this axiom must apply to Cæsarean section, for the reduction of the operative mortality will establish its position as a safer procedure than some of the more formidable vaginal deliveries.

Hitherto we have been too ready to estimate the success or failure of any manœuvre in terms of mortality and to overlook the morbidity. This is especially so in obstetrics: too often women have been assisted through a precarious pregnancy to a difficult delivery accompanied by trauma which has bestowed upon them prolonged invalidity. Many such cases, regarded as obstetric triumphs, have proved personal disasters to the patient and her family. This observation applies also to the serious deterioration, from pregnancy and labour, that occurs in the health of women who are the victims of serious disease, such as tuberculous infection, *morbus cordis*, chronic nephritis *et cetera*.

The thirteen Cæsarean sections presented in this paper were performed by me in private and institutional practice during the years 1924-1930. The classical operation through the anterior wall of the upper uterine segment was carried out in each instance. The suture material was chromicized catgut, two layers for the muscular wall and plain catgut for the peritoneum.

In Cases V, XII and XIII no vaginal preparation was made, but the vagina was flooded with ninety cubic centimetres (three ounces) of a 4% solution of mercurochrome introduced through a small rubber tube carefully passed to the vault of the vagina, the patient being in the raised-hips position. This preliminary technique I have also carried out in other cases necessitating considerable manual or instrumental procedures in the vagina, and I am satisfied that it is of considerable value and superior to the usual scouring of the vagina with ether soap, biniodide of mercury solution or other lotions. It causes no disturbance of the patient, can be carried out prior to anæsthesia, thus reducing the time of narcosis, and entails no risk of introducing organisms into the cervix which the usual scrubbing of the vagina certainly does.

In this series:

1. The maternal mortality was nil.

2. The fœtal mortality was small: two fœtuses were non-viable; one of seven months, abdominally delivered from a mother exsanguinated by hæmorrhage from a *placenta prævia*, lived only two hours, whilst the seven months child of a profoundly toxæmic patient died in a few minutes. All the children abdominally delivered at full term lived and thrived.

3. Six operations were for pelvic disproportion, three for *placenta prævia*, two for toxæmia, one for missed labour, and one for ankylosis of the hip joints.

4. The age incidence was from nineteen to thirty nine years.

5. Four only were *primiparæ*, the parity of the others varying from one to nine.

6. With one exception (Case V) the convalescences were very satisfactory and afebrile.

7. The patient in Case I underwent, at a later date, a subtotal hysterectomy for menorrhagia, the scar being found sound with muscular union and one small omental adhesion. In Case VII the emptying of the uterus was followed immediately by subtotal hysterectomy for extensive fibromyomata. In spite of the patient's jaundiced and toxæmic condition she made a rapid and good recovery both from the operation and the toxæmia. The patient in Case IX had had a previous Cæsarean section; the uterine scar thereof was found sound and of muscular character.

8. Of the six patients with disproportion, four were given a trial of labour and two were submitted to section on the antenatal findings.

9. None had experienced any attempt at vaginal delivery; six were not examined vaginally, their condition being ascertained by abdominal and rectal examination. The remainder were examined vaginally several (from one to four) times. All these examinations were made by careful practitioners with full aseptic and antiseptic precautions.

10. The anæsthetic used was ether given by the open method in twelve cases, and gas and oxygen in the toxæmic case, number VII.

Pelvic Disproportion.

When the relative sizes of fœtal head and maternal pelvis differ from normal so that the passage of the one through the other is doubtful, pregnancy can be terminated in five ways: (i) By spontaneous labour at term. (ii) After induction of premature labour, a method which inflicts no damage on the mother and gives the child a fair chance of survival.

TABLE I.

Number, Name, and Age.	Year.	Previous Labours.	Indication.	Condition of Patient at Time of Operation.	Technique.	Result.		Remarks on Puerperium.
						Mother.	Child.	
1. M.B. 34	1924	4	Central *placenta prævia*. *Ante partum* hæmorrhage. Exsanguinated.	Poor; pulse, 120; temperature, 35·6° C. (96° F.); respirations, 30.	Classical (chromicized catgut).	Good.	Good.	Satisfactory, afebrile. Subsequent hysterectomy for menorrhagia revealed a sound uterine scar with one small omental adhesion. One vaginal examination.
2. G.L. 30	1926	2	Indirect conjugate, 10 cm. (4 in.). Large fœtal head. No engagement. Fœtal weight, 3·9 kgm. (8½ lbs.).	Good.	Classical (chromicized catgut).	Good.	Good.	Satisfactory, afebrile. No vaginal examination.
3. I.G.C. 23	1928	*Primipara*.	Direct conjugate, 8·75 cm. (3½ in.). Trial labour, eight hours, second stage. No engagement.	Good.	Classical (chromicized catgut).	Good.	Good.	Satisfactory, afebrile. No vaginal examination, several by rectum.
4. D.D. 23	1928	*Primipara*.	Missed abortion at sixth month. Fœtus retained six weeks.	Good.	Classical (chromicized catgut).	Good.	Not viable.	Satisfactory, afebrile. Vaginally examined once.
5. R.K. 19	1928	2	Central *placenta prævia*. Severe *ante partum* hæmorrhage. Os small. Seven months.	Poor; exsanguinated.	Classical (chromicized catgut).	Good.	Lived two hours.	Stormy, suppuration lower angle of abdominal wound. Vaginally examined four times prior to operation.
6. R.C. 29	1928	4	Five months pregnant. Hepatic toxæmia. Ocular hæmorrhages. Cerebral confusion.	Poor.	Classical (chromicized catgut).	Good.	Not viable.	Afebrile, jaundice cleared in seven days, albumin in thirty days. Mental and eye condition improved gradually. Positive Wassermann. No vaginal examination.
7. A.H. 32	1928	*Primipara*.	Seven months. Hepatic toxæmia. Ocular hæmorrhage. Fibro-myomata. Blood pressure, 200/100 mm. of mercury.	Poor.	Classical (chromicized catgut); sub-total hysterectomy.	Good.	Lived few minutes.	Mild pyrexia, increased fourteenth and fifteenth days *post partum*; colpotomy drainage of pelvic abscess followed by convalescence. On discharge: Blood pressure, 140/90 mm. of mercury; slight trace of albumin. After twelve months: Blood pressure, 130/80 mm. of mercury; no albuminuria. Two vaginal examinations.
8. I.F. 20	1928	1 Craniotomy.	Direct conjugate, 8·75 cm. (3½ in.). In labour two days. Os dilated 2·5 cm. No engagement.	Good.	Classical (chromicized catgut).	Good.	Good.	Satisfactory, afebrile, discharged fourteenth day. Several vaginal examinations.
9. M.P. 23	1928	2 1st, Instrumental; 2nd, Cæsarean section.	In labour. External conjugate, 17·5 cm. (7 in.). No engagement.	Good	Classical (chromicized catgut).	Good.	Good.	Afebrile, discharged fourteenth day. No vaginal examination.
10. F.Q. 22	1929	2 Instrumental; still-born.	Direct conjugate, 10 cm. (4 in.). Large fœtal head. In labour. No engagement.	Good.	Classical (chromicized catgut).	Good	Good.	Afebrile, discharged fourteenth day. No vaginal examination.
11. U.H. 27	1929	*Primipara*.	Old tuberculous hip joints. Bony ankylosis. Left leg adducted.	Good.	Classical (chromicized catgut).	Good.	Good.	Afebrile, discharged fourteenth day. No vaginal examination.
12. W.M.H. 38	1929	9	In labour. Central *placenta prævia*. Severe *ante partum* hæmorrhage. Os dilated 5 cm. (2 in.).	Poor; pulse 120.	Classical (chromicized catgut).	Good.	Good.	Afebrile, discharged twenty-first day. Two vaginal examinations.
13. A.H. 39	1930	9 All difficult; cranial injuries to three children.	In labour thirty hours. No engagement. Uterine retraction starting. Direct conjugate, 8·1 cm. (3¼ in.).	Good.	Classical (chromicized catgut).	Good.	Good.	Afebrile, discharged seventeenth day. Three vaginal examinations.

(iii) By pubiotomy, a method which has found little favour in British countries, is fraught with possibilities of grave harm to the mother, and of which I have no experience. (iv) By Cæsarean section. (v) By some child-destroying operation which aims at the reduction of the size of the fœtal head.

Methods (i) and (ii) are the *desiderata* to be aimed at, but the exigencies of practice do not always make them possible.

Cæsarean section is the method of choice in conditions of grave disproportion that exclude the possibility of natural birth, even of a premature child.

The steadily increasing amount of antenatal investigation makes it possible almost to eliminate the emergency and neglected cases, and to separate the rest into two groups: (i) The safe cases, for which no difficulty is likely; (ii) the doubtful, in which difficult labour at term is to be apprehended.

It is obvious that such difficulty may be occasioned by the pelvis, by the head or by both, a normal pelvis with a large head producing the same problem as a justo-minor pelvis and a normal head.

The important measurements of the normal pelvis may be taken to be: Interspinous, 26 centimetres or 10·5 inches; intercristal, 29 centimetres or 11·6 inches; external conjugate, 20 centimetres or 8 inches. Such dimensions usually indicate a conjugate of 10 centimetres, or four inches, and a transverse at the brim of 12·5 centimetres, or 5 inches.

Roughly it may be stated that 2·5 centimetres (one inch) reduction of the interspinous and intercristal and 1·25 centimetres (half inch) reduction of the external conjugate should rouse a suspicion of possible difficult labour.

For practical purposes contraction of the pelvis can be divided into three groups, contraction of the first, second and third degree.

First Degree of Contraction. In contraction of the first degree there is a conjugate of not less than 9·3 centimetres (three and three-quarter inches) and a transverse diameter of not less than 10·6 centimetres (four and a quarter inches). Through such pelves an average fœtus can be delivered spontaneously.

Second Degree of Contraction. In contraction of the second degree there is a conjugate of between 9·3 and 8·1 centimetres (three and three-quarter and three and a quarter inches) and a transverse diameter of not less than 10·6 centimetres (four and a quarter inches). At the upper limit of these measurements spontaneous birth of an average full term fœtus is possible. As the conjugate approaches 8·1 centimetres (three and a quarter inches), spontaneous birth depends upon a transverse diameter of the brim being of dimension sufficient to allow of lateral movement of the head to bring the bitemporal diameter of 8·1 centimetres into the conjugate of the pelvis. This is the usual mechanism of delivery through a flat pelvis with a reduced conjugate and normal transverse diameter. Should the transverse diameter be also so reduced that lateral movement is prevented, delivery will be increasingly difficult or impossible.

Third Degree of Disproportion. A conjugate of 8·75 centimetres (three and a half inches) or less indicates obstructed labour for an average fœtus at term.

Treatment.

Patients with the first degree of contraction can be safely treated by induction at or before term, the exact date depending upon the antenatal findings. With practice it becomes more and more possible to estimate the fit of the head in the brim and to determine the latest date at which spontaneous delivery can be expected. Errors of judgement will be made from time to time; unnecessary inductions prior to term will be carried out, whilst others will be allowed by delay to pass into difficult labour. The first error is to be preferred to the second, and all mistakes will become less frequent as antenatal workers gain experience.

Faced with more serious degrees of pelvic contraction, the obstetrician must decide upon his *modus operandi*. Induction is seldom indicated, as prematurity would be too great to give any reasonable chance of a surviving child. Occasionally a small child may pass safely through the contracted pelvis, but more usually a Cæsarean section is indicated. When induction is the method chosen, it is important that there should be no delay after the decision is made. Too often efforts to induce labour are instituted at the chosen date.

Non-surgical methods of induction prior to term are often unsuccessful and need to be repeated or abandoned for the introduction of bougies or stomach tube into the uterus. Such delay may allow the optimum moment to slip by and a carefully conceived plan of campaign to miscarry. Once induction has been chosen, there must be no delay and efforts made to insure the onset of labour on the selected date.

Although the dimensions of the pelvis can be measured with moderate accuracy, those of the fœtal head must remain problematical. We know that the average full term fœtus weighs 3·4 kilograms (seven and a half pounds), has a suboccipito-bregmatic and a biparietal diameter each of 9·3 centimetres (three and three-quarter inches) and a bitemporal of 8·1 centimetres (three and a quarter inches), but we do not know that any given fœtus is an average one.

Familial divergences from the normal are common. In my own experience there have been two striking examples of unexpected variation.

One patient, a well built woman, bore to a husband of most generous proportions five children of average size, all of whom were "born before arrival." Widowed, she married a man of much less than average size and physique and to him she bore, after very difficult labours, three children, all of whom weighed over 5·4 kilograms (twelve pounds).

In such a case as this the early obstetric history would prove a false guide to the nature of her later confinements.

Another woman, with a very slightly flattened pelvis, required a Cæsarean section because her infant favoured the husband, who had a marked brachycephalic head, the infant's biparietal diameter being 10·6 centimetres (four and a quarter inches).

It is this incalculable factor that necessitates another procedure. The estimate of the fit of the head into the pelvis by Munro Kerr's method enables us to judge of the chance of spontaneous labour in most cases, leaving a residuum of doubt in others. These latter are those which should be given a "trial of labour." The exploitation of the trial labour, notably by the Dublin school of obstetricians, is one of the real advances of modern midwifery. By it a woman can be given every chance of natural delivery without invalidating the safety of subsequent Cæsarean section, should the necessity arise.

When trial of labour is made:

A. If, on examination after pains are well established, it is found that: (i) there is a large bag of membranes protruding low in the vagina and unoccupied by the presenting part, (ii) there is a definite vaginal cervix, (iii) the head is above the brim, Cæsarean section should be proceeded with without further delay.

B. If, on examination at the time of rupture of the membranes, it is found that: (i) the head has not entered the cervix and become "crowned" thereby, (ii) the vaginal cervix is still distinct or has reformed, (iii) the head is still above the brim, Cæsarean section is indicated.

C. If, on examination four or more hours after rupture of the membranes, it is found that: (i) the head is in the brim, greatly moulded with the presenting part, perhaps visible in the vagina, but its maximum diameter still above the brim, (ii) dilatation of the os has ceased, the anterior lip of the cervix is becoming elongated and œdematous or even the os has closed, (iii) the head is above the brim, (iv) uterine retraction is starting, Cæsarean section is urgently needed.

In such cases as these the alternatives are a high forceps delivery, or an attempt at such, or some child-destroying operation. The latter need hardly be considered; it is a relic of a past, when the peritoneal cavity was a land of terror to surgeons and the necessity for its use today must be regarded as a confession of obstetric mismanagement. It retains a small field of use in cases, happily disappearing, that have been so neglected that the head of a dead fœtus has become securely impacted in the brim or cavity of the pelvis.

It is difficult to find any justification for such a barbarous procedure as perforation of the skull of a living child. The high forceps operation is dangerous to the mother because of the risk of trauma and infection, and even more so to the child. Its attempt and failure gravely endanger the success of subsequent Cæsarean section. Even when it is successful, the risk is greater than that of section. German authorities give the maternal mortality in cases of high forceps delivery and of perforation as each of 6%. Under modern conditions of antenatal examination and trial of labour the mortality of Cæsarean section should be and is less than 2%. The fœtal mortality would, of course, be very greatly reduced by replacing such doubtful vaginal manœuvres by properly planned abdominal delivery.

Placenta Prævia.

It is in the treatment of *placenta prævia*, and especially of the central variety, that a great change of opinion has taken place in the last ten years. In 1898 Lawson Tait suggested, amid derisive comment, that Cæsarean section was justifiable as a treatment for *placenta prævia*. Many opinions and procedures of this celebrated pioneer, which were ridiculed by his contemporaries, are now well established obstetric and gynæcological manœuvres.

So with the operative treatment of *placenta prævia* there has been a gradual acceptance of Cæsarean section as a mode of treatment. The conduct of a case of central *placenta prævia* has always been fraught with danger and anxiety. The long favoured methods of version or the intraovular use of a hydrostatic dilator were full of danger to the mother from hæmorrhage, cervical trauma and sepsis, and almost invariably fatal to the child.

A comparison between the difficult and prolonged vaginal manipulations carried out in and through a field of operation which cannot be sterilized, and the scientific, surgical and aseptic procedure of a well timed Cæsarean section is entirely in favour of the latter.

The three patients in the above series, although they were suffering from considerable blood loss, gave astonishingly little trouble, either at the time of the operation or during the convalescence. Cæsarean section for *placenta prævia* is fraught with more hazards than for obstruction, the placenta is not always easy to remove from the non-contractile lower segment, the occurrence of *ante partum* hæmorrhage may lower the patient's condition, and the proximity of the placenta to the vagina introduces an added risk of sepsis. Whether the patient is in good condition or exsanguinated when first seen, Cæsarean section offers the most favourable chance; for in the first it obviates anything more than a normal loss of blood, whilst for the second it is the form of delivery that entails the least further bleeding.

So far very few figures are available to estimate the relative risks of Cæsarean section and the older procedures of version or use of the bag, but such as are favour the Cæsarean operation.

Professor Beckwith Whitehouse gives the following figures for cases of central *placenta prævia*, collected recently from the reports of maternity hospitals in Great Britain: With version a maternal mortality of 8·5% and a fœtal mortality of 95·3%; with Cæsarean section a maternal mortality of 6·6% and a fœtal mortality of 24·4%. In the Collective Investigation of 1921 Munro Kerr and Eardley Holland gave the Cæsarean section mortality in central *placenta prævia* as: maternal 11%, fœtal 22%.

These figures indicate an improvement during the past ten years in the maternal mortality and little change in the fœtal. The almost 100% fœtal mortality associated with version and the use of the bag must weigh heavily in the balance as against the 75% of living children obtained by section.

It is now generally admitted that abdominal delivery is, on all counts, the most favourable treatment for *placenta prævia*, but here again much depends upon the choice of time of operating. There is an optimum which must be seized, the patient must not be allowed to suffer dangerous blood loss, and no attempt at vaginal delivery must be made. In fact Cæsarean section must be the method of choice and not a policy of desperation.

Munro Kerr is still more generous in his application of the operation, stating:

> It appears to me, therefore, that this particular complication is peculiarly suitable for Cæsarean, and it may come to be the general method of treatment in all cases of central and marginal varieties.

He further gives the following figures for *placenta prævia* of all varieties. With version a maternal mortality of 4% to 10% and a fœtal mortality of 40%; with Cæsarean section a maternal mortality of 3% to 4% and a fœtal mortality of 4%.

As Cæsarean section is an operation that is performed in the interests of the mother, the preoperative condition of the fœtus is of small importance and the operation is justifiable even if the fœtus is already dead. Eardley Holland states:

> Cæsarean section is not contraindicated by the death of the fœtus, for the operation is mainly undertaken in maternal interests.

With a properly timed operation in suitable surroundings the maternal mortality for abdominal delivery for *placenta prævia* should be no greater than for contracted pelvis, namely, 2%; whilst, even in skilled hands, the mortality following conservative treatment is very definitely higher.

There remains to be considered the position of the teachers of obstetrics, especially in Australia, with its remote and distant settlements. To establish Cæsarean section as the treatment of *placenta prævia* to the exclusion of the older vaginal methods is likely to leave the future rural practitioners unprepared to handle this urgent emergency. All methods of treatment must still be taught, but it is to be hoped that, as transport facilities and country hospitals increase, difficult vaginal manœuvres in private dwellings will more and more be replaced by safer surgical procedures in hospital operating theatres.

Toxæmia of Pregnancy.

It is very justly universally accepted that the safest and correct treatment of toxæmia of pregnancy is one of great conservatism. The Eden analysis showed very clearly that the mortality following eliminative treatment was very much less than that of any surgical procedure. Table II contains the oft quoted figures.

Table II.

Obstetric Procedure.	Mortality.	
	Mild Toxæmia.	Severe Toxæmia.
Natural delivery, Induction of labour, Assisted delivery	5%	34%
Cæsarean section	11%	46%
Accouchement forcé	18%	63%

It is conceivably possible, by complete antenatal care, to abolish the preeclamptic and eclamptic sequelæ of pregnancy toxæmia and to restore the patient to such a condition of health that she may proceed to a spontaneous delivery with safety, but for some time yet some patients will be so profoundly toxæmic that anxiety and doubt as to the proper treatment will arise. In the majority the Dublin axiom, "Treat the toxæmia and ignore the pregnancy," will hold good, but there will remain a very small residue that will require bolder treatment.

To quote Munro Kerr again:

> Although I am quite convinced Cæsarean section is advisable in a few instances, but rather concentrate on preventive treatment, for, in common with many other obstetricians, I have rarely seen a case of severe eclampsia in a woman who has been carefully attended during her pregnancy.

The two cases of toxæmia in my series of Cæsarean section were of that grave and fortunately rare type in which the hepatic breakdown overshadows the renal.

> After very adequate medical treatment they were transferred to me in a very critical state. Both were markedly jaundiced and had severe epigastric pain; œdema was considerable and involved the abdominal wall; they were passing a few ounces of urine, heavily laden with albumin, blood and bile, which resembled thick coffee. The blood pressures were high, the pulse rate rapid and increasing, and the temperatures normal. Both had suffered ocular hæmorrhages and were developing cerebral symptoms of confusion and delirium. They were respectively six and seven months pregnant. The failure of medicinal treatment, the rapid and progressive appearance of grave symptoms and the resemblance of the clinical picture to that of acute yellow atrophy of the liver convinced me that any method of evacuating the uterus that entailed even twenty-four hours' delay would have been dangerous. Immediate abdominal delivery was therefore carried out. The results were satisfactory, in spite of the desperate condition of the patients, and in spite of the fact that one hysterotomy was followed by subtotal hysterectomy for fibromyomata.

The types of toxæmia in which the hepatic symptoms predominate are very grave and dangerous, the occurrence of bile in blood or urine or any excess of urinobilinogen in the blood, as detected by Fouché's test, should compel all obstetricians to consider seriously rapid emptying of the uterus if conservative treatment does not result in speedy improvement.

There remain certain cases in which the toxæmia is superadded to some obstetric difficulty. It is obvious that any obstruction to delivery must be

treated in spite of the toxæmic condition, but the method adopted should be that entailing the least possible disturbance and trauma. If the child is living, Cæsarean section is probably the most satisfactory way of handling the condition; if the child is dead or dying and unlikely to survive any form of delivery, embryotomy is indicated.

Stroganoff and Dublin have fully justified their claims for the safety of the conservative treatment of toxæmia, but a rule without an exception is itself an exception to the rule, and there are a few cases of rapidly developing and uncontrollable toxæmia that demand so speedy a termination of pregnancy that Cæsarean section is the only method available.

The two remaining cases in the series were of unusual type.

Section was performed in one case of missed abortion at the sixth month with retention of the dead fœtus. The uterus was evacuated abdominally because it was considered a safer procedure than either wide dilatation of the cervix or vaginal hysterotomy.

The other case was one of complete bony ankylosis of both hip joints from old tuberculous disease. The left leg had also been amputated above the knee and the stump was adducted. There was no marked pelvic deformity revealed by radiographic examination, but access to and delivery through the vulva seemed so difficult that Cæsarean section was decided upon.

The Uterine Wall.

When Cæsarean section is confined to such cases that the operation offers less or no greater risk than any other obstetric procedure necessary to overcome the difficulty, the only objection is the weakening of the uterine wall and the risk of rupture during a subsequent pregnancy or labour. Eardley Holland has shown that in all classes of cases many desperate emergencies accompanied by sepsis, and treated by surgeons of varying capacity, 4% of patients who undergo Cæsarean section and who again become pregnant, experience rupture of the scar. This percentage is today undoubtedly less and will be still more reduced when abdominal delivery ceases to be an emergency and becomes an operation foreseen and planned for the most favourable moment.

There has been much discussion of the suture material used, and this or that substance has been blamed for the occurrence of faulty scars. Silk, silkworm gut and catgut all have their advocates. The soundness of a scar in the uterine wall or any other tissue depends less upon the suture material than upon the maintenance of asepsis. In other parts of the body that are difficult to sterilize, similar danger exists. For example, all gynæcologists are aware of the risk of secondary hæmorrhage after plastic operations upon the vaginal cervix. It is not the suture that is at fault, but the asepsis or hæmostasis. Given aseptic and hæmostatic wound surfaces, union occurs so rapidly that any suture that will last five or six days will insure satisfactory healing. On the other hand, if the opposed surfaces are infected or separated by extravasated blood, no suture material will prevent ultimate separation and possible hæmorrhage. Similarly, in the uterine wall, if there is any infection of the wound, union will be imperfect, regardless of the suture material used. It follows from this that weak uterine scars can be reduced to a minimum by such obstetric care that emergency Cæsarean section, cases in which forceps fail to effect delivery, futile attempts at version and all other manœuvres that infect the uterus will be unknown and the operation of abdominal delivery will be as carefully planned and provided for as, say, a gastro-enterostomy for a duodenal ulcer.

Conclusion.

This paper is not intended to survey the whole question of Cæsarean section, its indications, dangers and performance, but to express views formed as the result of the limited experience of the cases set out herein.

There are other conditions, both obstetric and constitutional, which fully justify the operation, especially gross organic disease of the mother, such as tuberculous infection and *morbus cordis*, but they are outside the intention of this paper. The plea set out and upheld is that Cæsarean section shall be placed definitely and unequivocally upon the list of obstetric manœuvres, that in the light of recent experience and progress its indications shall be so well defined that a decision to operate can be made without delay or loss of time, allowance being made thereby for proper preparation for an abdominal operation, that its performance shall be assured at the optimum moment and not as a forlorn hope after futile and disastrous attempts at some dangerous or impossible vaginal delivery, and that indecision begotten by hesitation out of hope shall not permit a labour to proceed to a state of impaction or grave loss of blood.

If, by careful antenatal and intranatal observation, these *desiderata* are obtained, then both the maternal and fœtal mortality, the maternal and fœtal morbidity and doubtful uterine scars will be reduced to such negligible figures that all these factors will cease to be any excuse for such tardy decision to operate as may invalidate the safety or success of the proceeding.

THE TREATMENT OF EPITHELIOMATOUS GLANDS OF THE NECK.[1]

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In this paper I propose to limit the discussion to secondary epitheliomatous glands of the neck, and in consequence the primary foci of malignant disease of greatest import will be neoplasms of the lips or buccal cavity. Of course, epitheliomata of the integument of face, scalp or neck may infect the glands

[1] Read at the Second Cancer Conference, Canberra, March, 1931.

in question, as may similar lesions situated in naso-pharynx, oro-pharynx or laryngo-pharynx and the upper part of the œsophagus. Cystic and solid epitheliomata of probable brancho-genetic origin are commonly seen. Also there is the infection of the cervical glands with epithelioma which has previously passed through a lymphatic gland, and this gland may be situated either in the neck, mediastinum or axilla.

From a therapeutic point of view the treatment of a secondarily involved epitheliomatous gland is a problem which is considerably altered by the site of the primary growth; and the problem is made vastly more complex by the variability in the malignancy of tumours belonging to this group. Here we are concerned with the initial tendency to metastasization, the accessibility of the gland field either to surgical operation or radiotherapy, the behaviour of the involved gland, firstly to its own growth and secondly to the further dissemination of neoplastic cells.

It is impossible to lay down any definite routine of treatment, for no two cases present the same clinical features, and each must be considered as an individual problem. But clinically we find these cases grouping themselves into classes in which certain broad principles of treatment follow definite clinical indications.

In three years of clinical work at the Melbourne Hospital Radium Clinic there has been much work of an experimental nature, yielding both failures and successes. Much of our present routine has been justified by the lessons of these experiences. Hence I wish to enter this discussion from a clinical aspect, my conclusion being guided by the results of cases which we have treated in the clinic.

The large majority of patients in this category presenting themselves for treatment are sufferers from epithelioma of lip or tongue; the metastasis occurs therefore in the upper cervical lymph glands. In many cases the primary growth has been treated with radium.

The Time Factor in Treatment.

The routine which we employ is to attempt to clear the primary growth before treating the secondary deposits. This is subject to certain exceptions which will be presently enumerated. During the reaction I believe that a good blood and lymphatic supply is necessary. If either be interfered with, as in preliminary gland treatment, the reaction is much more severe, and the tendency to stagnation in blood and lymph channels, prolongs the inflammatory process and delays healing. Laborde,[1] following Roussy and supported by the researches of Jolly, states that interference with the blood supply of a neoplasm diminishes its radio-sensitivity.

Malignant embolism with growth in the lymph glands appears to be a definite factor in obstructing the lymph flow, and if one set of channels be obstructed, the lymph will open new channels, thus accounting for the widespread glandular dissemination. This lymphatic obstruction probably accounts for the longer time taken for the reaction to subside and healing processes to be complete when fairly extensive secondary deposits are present. In some of these cases the secondaries have gone so far ahead while we have been waiting for healing of the primary focus, that the glands have got beyond our control. This has indicated that when the glands are extensively involved, their treatment should be instituted as soon as the reaction has subsided and healing has well set in.

In the average cancer of tongue or lip glandular treatment is undertaken about eight weeks after the initial radium treatment; by this time the primary growth has practically healed. If the primary growth has not received sufficient radiation, it is considered wise to irradiate the residual lesion before treating the glands; as when this is not done, the subsequent treatment of the primary growth is rendered much more difficult and less effective, and further lymphatics will be opened along other paths and further glands will be involved.

There are two exceptions to the above general ruling.

The first includes cases of the so-called sarcoma of the tonsil. English pathologists now look on these tumours in the large majority of cases as lympho-epitheliomata.[2] Whether the tumour be sarcoma or lympho-epithelioma, there is rapid invasion of the glands which become enlarged and softer than similar epitheliomatous glands. Following needling of these tumours, a radium pack should be applied to the gland areas before the patient leaves hospital. In the first such case treated such rapid development of secondary deposits occurred, that further treatment at the end of six weeks was quite hopeless. These metastases respond to the radium pack and no untoward result has appeared owing to cross-fire. On account of the malignancy of these tumours and their pronounced radio-sensitivity, surgical removal of glands should not be considered.

The second exception occurs when X ray treatment to lymphatics is given as a preliminary to radium treatment of the primary growth. This is given where glands are enlarged and likely to get out of hand during the reactionary period.

X ray treatment should not be given if the glands are impalpable, or if they are only small, as the subsequent reaction following application of a pack is much increased and healing is retarded; there is also increased risk of complications following the pack.

X ray therapy apparently has only, in my experience, a temporary inhibitory effect on the epithelial secondary deposits, and hence its use with these indications. The value and indication for deep therapy will be more fully discussed at a later stage.

The glands are naturally subdivided into four large groups, and I intend to discuss each in detail.

They are: (i) Glands not obviously involved following clearing of primary growth, (ii) enlarged but operable glands, (iii) glands just inoperable, (iv) glands definitely inoperable.

Groups of Cases in which no Glands are Palpable Following Clearing of the Primary Growth.

Before dealing with the treatment of cases in which no glands are palpable following clearing of the primary growth, I should like to draw attention to a clinical finding on which we have come to place importance. In many cases no definite glands have been palpable, but bimanual examination, particularly in lip cancer, reveals a definite thickening in the tail of one submaxillary salivary gland as compared with its fellow. We have watched several such cases and later typical involvement of the submaxillary glands has appeared.

Case I: H.A., aged sixty-four years, had an early epithelioma of the hard palate treated by means of a suitably constructed dental mould containing radium in July, 1929. The lesion cleared up. No glandular involvement was detected at the time. The patient reported for routine examination and in August, 1930, the primary remained clear, but thickening in the left submaxillary salivary gland as compared with its fellow was noted on bimanual examination. No definite enlarged lymph gland was detected. In November, 1930, this thickening had increased. In January, 1931, the thickening had increased, with the appearance of adjacent enlarged lymph glands which appeared to be typically malignant. He was sent to a surgeon who advised against operation on account of his general condition. A radium pack was therefore applied.

It is well known that small lymph glands—the paramandibular glands—exist inside the capsule of the submaxillary gland. These drain a limited area of the buccal mucosa directly, and their efferents pass to the submaxillary group of lymph glands. Whether these small paramandibular glands are directly involved it is difficult to determine, but I am inclined to think that the thickening is due to congestion following embolic obstruction of the submaxillary glands which have not as yet shown clinical enlargement. This sign is to be regarded as an indication for treatment of the lymphatic field. The necessity for bimanual examination in the search for submaxillary glands must be stressed.

All authorities, for example, Dew[3] and Rowlands and Turner,[4] are agreed that in lingual and buccal epitheliomata with absence of palpable lymph glands, the glands should be extensively excised. In cancer of the lip, the malignancy being frequently less virulent, many authorities are content to keep the patients under observation.[5] It is wiser to insist that either surgical or radiological treatment be carried out in every instance.

Factors which must influence a decision as to operation include age, occupation and habitat of the patient, and the latency of malignant glands.

In young patients I think that operation should always be advised in the absence of gland enlargement. A radical removal of the glands under these circumstances is safe and prevents possibility of recurrence in these areas. If histological examination of the glands reveal involvement, operation should be followed by the application of a radium pack. In England many such patients are kept under observation without treatment, but in Australia, where a patient is so apt to live in the country, he may fail to report till the mischief is too extensive for satisfactory treatment. Rowlands and Turner state:[6]

> This [excision of glands] should certainly be a rule in hospital patients owing to their carelessness and the difficulty of keeping them under observation.

The latency of some malignant glands which are not palpable, confirms this decision. All observers are agreed that glands may not show for a period of two years. I have seen a case in which glands appeared four and a half years after a lip had been cleared up with radium. In these cases it is my experience that when the growth does commence after a long latent interval in which the patient regards himself as cured, the growth is extremely rapid; and I have seen a case in which a gland was broken down, with a history of a lump being present for only one week. This tendency to rapid growth makes subsequent treatment the more difficult and the less effective, and emphasizes the necessity for treatment as an initial step.

The elderly patient is the problem in such cases—one hesitates to submit to operation a man of sixty to seventy in not good condition—and in these, as in the previous group in which operation is refused, I consider that a radium pack should be applied to the areas.

Of this I am certain, that it is unwise to leave any such condition untreated, for though certainly many may never manifest malignant involvement of the glands, others definitely will; and it is only by early and effective treatment that the figures for this class of case can be improved.

The Group of Cases in which Cervical Glands are Involved and Operable.

After the primary growth has apparently been eradicated, indications of which state will be apparent in about six to eight weeks, I think that when cervical glands are involved and operable, operation should be performed. Surgeons are of the opinion that operation should be extensive and thorough. In lingual malignant disease excision should be bilateral, but in lip cancer this is rarely necessary. The gland-bearing tissue should be submitted for section, and if there is evidence of involvement, a pack should be applied to the gland areas two to three weeks after operation. It would be unnecessary to give further radiological treatment in the absence of histological malignant evidence. But in such cases, if the primary growth conformed to a highly malignant type, application of a pack should be considered as an additional safeguard.

Operation should be advised as against radiation treatment alone, as the operation results are good. The mortality rate is not unduly high, and the most important factor is the removal of the infected tissue, with the subsequent benefits of relatively increased depth dose from the pack.

If operation be refused or inadvisable a pack should be applied.

In many cases in which a lingual or buccal primary growth is being irradiated, needles may be planted on the deep side of the submaxillary glands to check possible extension in this direction.

The Group of Cases in which the Glands are Just Inoperable.

The group of cases in which the glands are just inoperable would also include those which at operation are found to have a more extensive malignant spread than was clinically apparent. The principle of treatment here to be adopted is to operate, remove as much of the malignant tissue field as is possible, and to follow this procedure with application of a radium pack to the area as soon as the wound is sufficiently healed—usually two to three weeks.

It has been advised, when malignant tissue is definitely left behind or when the surgeon is not satisfied with the completeness of the removal of the malignant tissue from certain areas, that radium needles or seeds should be used to irradiate these areas. Such was done on a few occasions at our clinic, but the results were not good. It was found impracticable with either needles or seeds to obtain an effective homogeneous radiation of the exposed gland field; in the cervical areas the needle threads predisposed greatly to sepsis, with the inevitable complications of delayed healing and the possibility of accelerated malignant recurrence. In addition the subsequent radiation by pack was rendered much more difficult on account of the previous interstitial radiation and ensuing reaction. Even with gold seeds it is difficult to get a sufficiently homogeneous radiation, and their smaller screening (0·3 millimetre of gold) makes it risky to use them near the mandible. Should sepsis follow the use of seeds, they would tend to act as foreign bodies and perpetuate the state.

In cases in which operation revealed that the growth was more advanced than anticipated, rapid recurrence, delayed healing of the wound with sinus formation, and later sepsis were common complications. It was taught that sepsis was a contra-indication to radium treatment, and in the first two such cases received almost simultaneously at the clinic, it was decided to apply the usual dose in two half applications at about six weeks' interval. At the end of the appointed time it was found that in each instance the malignancy had not retrogressed, but had progressed at such a rate as to make the completion of the radiation absolutely impossible.

CASE II: J.B., aged sixty-one years, reported on February 18, 1929, with an extensive epithelioma of the right anterior border of the tongue and sublingual region. Submaxillary glands were palpable on each side. Radium was buried in the tongue on February 25, 1929, following a dose of X rays to each side of the neck. The tongue involvement cleared up well with radium, and he was sent for excision of glands on April 1, 1929. Before the operation there had been rapid extension of the glandular involvement. One month later the operation wound had not healed, and a mass of glands had appeared under the right sterno-cleido-mastoid muscle. A pack was applied on May 27, 1929, but there was inflammation of the skin and the wound was still discharging. A dose of half a millicurie per square centimetre at two centimetres distance was given in the hope that the dose might be repeated in six to eight weeks. The dose produced general erythema. During the following month the epithelioma increased in the cervical regions.

Shortly after, two further cases were sent. At operation in the one instance it was found that the submaxillary glands were unexpectedly attached to the mandible, and in the other case the surgeon was unable to complete the removal of the malignant tissue. When each patient was seen there was a discharging sinus with evidence of malignant recurrence. It was decided to give a full dose in each instance. In each the reaction was stormy, and complicated by sepsis. In one healing was somewhat slow, but both cases cleared up, and now the patients show no evidence of malignant disease.

CASE III: E.T., aged fifty-four, reported to the clinic in August, 1929. An epithelioma of the lip had been excised three years before. Two or three months before reporting he noted enlarged right submaxillary glands. He reported to his surgeon, who operated, but was unable to remove the malignant tissue completely owing to fixation to the mandible. The patient reported with a recent scar, the right submandibular area was reddened and infiltrated, and at the anterior end of the scar was a point discharging mildly infected material. A two centimetre pack was applied with a dose of 180 milligramme-hours per square centimetre; the total area irradiated was 150 square centimetres, giving 27,000 milligramme-hours in ten days. The skin healed in six weeks. At present there is no obvious malignant disease.

It appeared that the radiation disposed of the malignant elements and the defences of the patient then overcame the complicating sepsis.

Therefore in all cases following operation, complicated or uncomplicated, the full dose must be given. There is thus a much better chance of a good result from the pack, as the depth dose is relatively greater, following removal of the involved tissues.

At this stage it may be well to stress the fact that the pack must cover an adequately wide area. To radiate satisfactorily the anterior triangle, the pack should cross the mid-line anteriorly, and posteriorly it should pass from the mastoid process to the middle of the clavicle. The lower limit should always coincide with the clavicle. In the first case treated following a not very extensive operation the area covered by the pack was the area actually exposed at operation—roughly the upper half of the neck. This was followed by a recurrence of malignant disease behind and below the treated area, which latter was free. Here the lower groups of deep cervical glands were actually, though not obviously, involved at operation, and this area was missed in the subsequent radiation. The history and pathological aspects of this case were reported by Wright-Smith.[7]

The Group of Cases where the Glands are Frankly Inoperable.

Various types of cervical malignant disease are seen in the category of frankly inoperable glands.

These are: (i) Diffuse types with strings of numerous small glands, (ii) glands or gland masses fixed to or involving bone, (iii) solitary or multiple infiltrating masses with or without outlying glands, (iv) bilateral extensions, (v) infiltrating masses involving skin or deep structures, (vi) septic or ulcerated conditions.

It must be recognized that in this type of case the primary focus is often large and extensively infiltrated, the patient is rarely in good condition, and in the advanced lesions it will usually be found necessary to attack the secondary deposits before the primary is thoroughly healed.

Before discussing the treatment of these types it would be well to examine the therapeutic agents and methods at our disposal: (i) Surgical operation is out of the question and diathermy has largely been abandoned as a therapeutic agent. (ii) Radium-at-a-distance treatment, varying distances being used for varying depth doses by pack. (iii) Buried radium, either as needles or in the form of seeds or emanation needles. (iv) Deep X ray therapy is available. (v) Mass radium treatment.

Treatment should be carried out along the following lines:

If there is no great depth of lesion, radiate the gland field with a Columbia paste collar (pack), using two centimetres distance. As an extensive primary and usually an extensively involved gland field exist when these patients are first seen, the usual practice has been to radiate the involved areas immediately with deep therapy, a submaximal or maximal dose being given. This has been necessary because it is rarely that immediate radium treatment can be given on account of the waiting list, while the deep therapy can be administered usually at once. This treatment will inhibit further malignant growth while the primary is being treated, but it complicates the reaction and healing following the pack. We have found that doses of 180 milligramme-hours per square centimetre are the most that a skin that has been radiated by X rays will stand. This dose, of course, desquamates the area, and healing takes about two months—occasionally longer. When no X ray treatment has previously been given, healing is usually complete within six weeks with this dose.

Where the malignant infiltration is fairly deep, or if there is a definite malignant mass, we have found that the depth dose from a two centimetre pack is insufficient to cause destruction of the malignant cells.

If the mass is diffuse, such as would be found in a secondary malignant deposit deep to the upper part of the sterno-cleido-mastoid muscle, arising, for example, from a lingual primary, it is necessary to increase the distance. So far we have done little work at three centimetres, but in the above type of case the indications are very favourable.

CASE IV: J.G., aged sixty-six years, had an epithelioma of the left lateral border of the posterior third of the tongue treated with radium on June 23, 1930. The primary focus healed completely. There were glands palpable before the treatment, but these went ahead rapidly, and by the time the primary focus was healed there was a diffuse malignant secondary mass deep to the left sterno-cleido-mastoid muscle, fixed deeply and showing as an obvious tumour of the region. The skin was not involved. The mass was regarded as inoperable by a surgeon. A radium pack was applied, a dose of 266 milligramme-hours per square centimetre at three centimetres distance was given in ten days. The total area was 155 square centimetres, giving a total dose of 40,320 milligramme-hours. The area was healed in less than six weeks, the tumour subsided, and at present there is no evidence of any malignant disease.

Smith and Smith[9] give two millicuries as the dose to be used at this distance.

Increase of distance means a much larger and more uncomfortable pack and a greatly increased quantity of radium or radium emanation as source, so a balance must be struck between these factors. In all cases we attempt to complete the radiation from the pack in ten days, allowing no time off unless there is so-called radium sickness. If the time is continued beyond ten days, reaction frequently sets in, and the irritation of the pack on the inflamed area is very trying to the patient.

Very frequently large and localized malignant masses are seen developing from the glands. These may be: (i) Solitary malignant masses, even occasionally broken down and occasionally infected, (ii) similar masses with outlying glands, (iii) a moderately widespread infiltration of a region.

It is useless treating fluctuant masses with a pack. In no case have we seen resolution, and it is apparent that the depth dose is insufficient to affect the deeper cells.

Not infrequently we see a mass of malignant gland, for example, a submaxillary gland, apparently grown from a single gland and with no evidence of outlying glands. It appears that the malignant elements grow in the gland and sepsis or other causes produce a perilymphadenitis which blocks the efferent lymphatics. The gland grows in solitary state and may break down under the combined factors of growth and sepsis.

In such cases we cut through the skin and open the fluctuant glands. If gross sepsis is present, it is combated by usual methods, and seven to ten days later or at once if the typical glairy fluid of a degenerated gland is apparent, radium needles are buried in and around the lesion. Occasionally two layers of needles are used, a deep and a superficial layer, and we attempt to use one milligramme to one cubic centimetre of the area radiated.

CASE V: P. O'K., aged sixty-three years, reported in September, 1929, with a recurrent epithelioma involving the whole of the upper lip and an apparent implantation epithelioma on the lower lip. There was a broken down solitary left submaxillary mass about four centimetres in diameter. Into the lips radium needles were buried on September 10, 1929. At this time the gland mass was opened with escape of infected broken down material. During the subsequent fourteen days dressings cleaned this area and radium needles were buried in and around this mass on September 24, 1929. Subsequent examination showed that this mass completely retrogressed. A pro-

phylactic pack to the gland fields was applied seven months later. Glands appeared in the right side of the neck and subsided under a pack applied in December, 1929. The patient remains apparently free of any malignant involvement.

CASE VI: H.D., aged forty-three years, reported on February 5, 1929, with a small epithelioma of the left external ear. There were several small hard glands in the left side of the neck in the superficial cervical chain and in the left posterior triangle. A superficial distance radium applicator failed to clear the lesion, and radium needles were buried in the ear on March 20, 1929. Following this the lesion healed with some loss of cartilage, and as the glands subsided their enlargement was regarded as of probable septic origin. Twelve months later, on March 7, 1930, a large hard infiltrating mass appeared in the left supraclavicular area, six by eight centimetres in size and raised three to four centimetres. On April 2, 1930, Dr. Clendinnen buried in the mass for seven days ten unit strength needles, totalling twenty-two milligrammes. On May 23, 1930, the mass had practically disappeared; a slight thickening remained attached to the skin. Further needles were buried into this (three three milligramme unit strength paltinum needles). On January 6, 1931, the neck appeared free of malignancy. The primary site was clear.

Where the mass has been relatively small, the results have been very successful, but in more extensive cases where there is much malignant infiltration of a region, for example, in both submental and submaxillary regions, the effect of the radiation appears to show that it is only in the insufficiently irradiated areas that the malignant disease does not respond.

Where the mass is relatively small and needling has been local, it is advisable to follow with a complete radiation from a pack some four to six months later.

In some of these cases with large inoperable masses in the neck, we have used gold seeds. We have used these at strengths from one to two millicuries with an average length of eight millimetres. The screen is 0·3 millimetre of gold. The reactions have been fairly severe, and best results have been obtained when the strength of the implant was 1·2 to 1·5 millicuries. It is inadvisable to use such implants of a greater strength than 1·5 millicuries, when attempting to space them one centimetre apart.

It is apparently the opinion of the French school that buried radium should not be used in the treatment of secondary cervical malignant disease. Laborde[10] says that radium puncture of gland masses is not a technique to be recommended because it does not permit of a sufficiently homogeneous radiation of the lymphatic field, and it favours the dissemination of neoplastic elements. It is, in her opinion, not a method to be used.

The cases in which needles are buried must be carefully chosen; the mass must be fairly deep and must be localized. The presence of outlying glands would be a direct contraindication. The presence of a reddened, broken or atrophic integument would be an indication for the use of needles as against the use of a pack; for with needles the radiation is much more local and does not necessitate the passage through the skin of the full dose of radiation received by the neoplasm, especially when the skin is in poor condition both to stand this radiation and to initiate healing processes.

It must be borne in mind that no good prognosis can be given in any such case, especially if the glands are extensively involved; for in most instances there will have been general dissemination, malignant cells having been passed into the great veins through the large jugular lymph ducts draining the deep cervical glands.

In ulcerated malignant masses of the neck it is worth while using needles if there are no outlying glands. Results are frequently surprising. Where ulceration has taken place, it is often a manifestation of a localized growth, the further spread of the malignant elements having been blocked for reasons already referred to. Further spread tends to be of an infiltrating type and hence the liability of submaxillary masses to invade bone. Treatment then invariably leaves a chronic discharging osteomyelitis. Pain is severe and intractable. The treatment to be recommended for ulcerated masses is needling with unit strength needles. Difficulty is occasionally met with in radiating the centre of the growth on account of the friability of the tissues, and a supplementary pack to the area is occasionally necessary, if somewhat unclean.

CASE VII: B. reported in August, 1923. An epithelioma of the lip had been removed three months before, and was followed by surgical removal of the glands. On examination, there was a large malignant recurrence forming an ulcerated mass some five centimetres in diameter, situated below the left mandible. Six tubes, each containing ten milligrammes of radium, screened with two millimetres of silver, were buried deeply into the mass. This was followed by an external application of radium to the surface of the malignant growth. A full dose of deep therapy was given to the whole of the gland fields of each side of the neck, and this was repeated two months later on the left side. Again, three months later, a further three-quarter skin dose of deep therapy was given to each side of the neck, and to the residual lesion a further external radium treatment was given. The lesion healed, and the patient has now been well for eight years.

This illustrates what can be done with intensive radiotherapy in these cases, though at the present day, following the introduction of platinum needles, the technique would naturally be modified by their use.

To a large cancer clinic inevitably come many patients with advanced buccal cancer with very extensive secondary deposits. Unless there is definite hope of causing real palliation, radium is better not used, for the reaction is very severe, feeding most difficult, and the end result no different to that which would ensue had no treatment been given. If treatment other than relief of pain must be instituted, probably the wisest form of treatment is deep therapy. But I have rarely seen much useful result beyond temporary inhibition of the neoplasm, though the psychic effect of the therapy machines is initially great.

Deep Therapy.

The general consensus of opinion seems to be that deep therapy has little action on secondary epi-

theliomatous glands. Laborde[11] has found that the metastases of epithelioma of the buccal cavity are resistant to deep X ray therapy and she has given up the use of this form of treatment. She worked at 200,000 volts.

I think I have expressed already my opinion of the value and indications for deep therapy treatment in practice. On epitheliomatous glands, I think that the most that can be expected is an inhibiting action on the malignant cells. I can recall no case which has resolved under deep therapy, but numbers that have become quiescent under its influence, and many in which there has been little obvious action. But, nevertheless, there is many an epithelioma in a large clinic for which the clinician finds it necessary to use X rays for their palliative and inhibiting action.

In the initial treatment of an involved glandular field, they should be used only when there is a probability of the enlarged glands getting out of hand during the treatment, reactionary or healing stages of the primary neoplasm.

Deep therapy should not be used if glands are absent or at this stage small, as the effect on the subsequent reaction and healing following the radium pack is to aggravate and delay these stages. Complications are the more likely to follow.

Deep therapy has a use in the palliative treatment of hopeless cases, but here, of course, little can be expected from it.

Mass Treatment.

We have tried mass treatment in a few secondary epitheliomatous cervical masses. There has in each instance been some considerable reduction in the size of the mass, but the mass has never completely disappeared and later has again enlarged.

In our machine we have one gramme of radium, and the apparatus is so cumbersome that it is very difficult to get it in contact with a cervical field; its manipulation is so difficult that the accurate use of cross-fire fields in such a difficult area is virtually impossible. In addition, it takes at least thirty hours to obtain an erythema dose on one field, and the patient can tolerate but few hours a day. This time is effectively reduced by the lack of apposition and at present we have considered that with our apparatus we are unable to deliver an effective dose to the deeper cells. Except in special cases, its use has therefore been abandoned in the treatment of secondary cervical epithelioma.

Packs.

Before concluding I should like to say a few words about packs. Our routine is first to mark the field to be radiated with a skin pencil. The area must be sufficiently large to irradiate the gland bearing field, and Regaud's principle that the glands beyond those definitely involved must also be regarded as involved, must be kept in mind. I have already stressed the necessity of radiating the lower deep cervical glands by taking the lower limit of the pack to the clavicle. This outline is then transferred directly to a piece of soft tissue paper by placing the latter in contact with the gland field, the blue marks being transferred to the paper by gentle pressure along the marked lines. The area is then calculated in square centimetres by triangulation of this area, the total dose in milligramme hours required is obtained, and finally the amount of radium necessary is calculated. The clinician in all cases orders the dose to be given to the gland areas in milligramme or millicurie hours per square centimetre. Only by this method can any accurate uniformity of dose be obtained.

The distance used is usually two centimetres, occasionally three centimetres. The sources of radiation are radium needles or radon in suitable tubes. The screenage is usually 0·5 millimetre of platinum but we do not hesitate to use monel 0·5 needles, as we have been advised that two centimetres thickness of Columbia paste will cut out β rays. No additional screening is used, as the increase in weight of the pack was found to be too great to justify the step. Uniform reactions are obtained by concentrating the radium to some extent at the edges of the pack. The duration of treatment is ten days, and it is only very occasionally necessary to reduce the time.

Looking over the cases of epitheliomatous glands of the neck which have not responded to treatment, one is always left with the thought that the radiation has been inadequate. Even with lips, I have frequently seen an area fail to clear up when a needle has come out accidentally, and I am convinced that an interstitial dose of five days per milligramme or 120 milligramme hours per cubic centimetre is insufficient to cause resolution of an epithelioma. It is stated that the glands are more resistant to treatment than the primary growth, that is, if anything, they need more radiation. With a pack these factors must be borne in mind. Not only are we not giving radiation from an interstitial source, but we are giving it at a distance of two centimetres from the skin, and we therefore must, whenever the glands are small, give an effective dose at a depth of at least three centimetres from the pack surface. In many cases greater depths must be reached, but to attain these we must use a greater distance in radiation. If one is radiating a field, it appears to be quite illogical to irradiate that field unevenly, for a malignant cell in one situation, even if solitary, would appear to need just as big a dose as another malignant cell forming one of a larger group of cells. Thus I think it quite wrong to irradiate a gland field, where there is no obvious enlargement, with a considerably smaller dose than if enlarged glands of moderate degree were present. The only thing to do in such a case would be to restrict the field in the former case, having regard to Regaud's principle; but experience has taught us that this is not a wise move.

I have shown that I believe an interstitial dose of 120 milligramme-hours per cubic centimetre to

be insufficient. Therefore, if we are working at two centimetres distance from the skin with the hope of obtaining an effective depth dose at some distance between 0·5 and 1·5 centimetres below the skin, we must at least give a greater dose than 120 milligramme-hours per square centimetre. Cross-fire effects will, of course, help us with distance. So the problem states itself. We are required to find the maximum dose above 120 milligramme-hours per square centimetre that can be borne by the skin. Our results tend to show that an erythema dose is somewhere in the vicinity of 90 milligramme-hours per square centimetre at two centimetres distance, though this may, of course, vary in different subjects. Consequently it was necessary to go much further than the production of an erythema; or if an erythema was just produced, the value in regard to a destructive point of view was practically nil. We are aware that inhibition of malignancy can be produced by small doses, but with radium treatment our object should be to destroy the cell at the first treatment, for the skin will not stand subsequent treatments and the cell becomes radio-resistant.

Many of our early patients on whom packs were used, had had deep therapy previously, and we found that 180 milligramme-hours per square centimetre was the greatest average dose that such patients would stand, and similarly, was the lowest dose that produced an effective result. Patients who have not had deep therapy would stand a larger dose at two centimetres and healing would occur quickly, probably doses up to two millicuries per square centimetre, though I have never given so large a dose.

No risks can be taken in malignant cases, and the doses should be the maximum that the skin will stand. Our objects should always be to destroy the malignant cell and not to render it quiescent. If this latter be done, the patient will suffer a much smaller reaction, but when the inevitable recurrence occurs, both the clinician and the patient will regret that the initial radiation had not been more effective. We have still much to learn, but it would appear that we are working along lines that will ultimately allow us to treat secondary epitheliomatous malignant disease with more constant hope of success.

Acknowledgement.

I wish to thank Dr. Clendinnen for his kind permission to quote the above cases.

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THE MODERN TREATMENT OF MAMMARY CANCER.[1]

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In this paper an answer will be sought to three important questions concerning treatment in cancer of the breast.

What is the Best Available Method?

In the light of our present knowledge and experience the best system of treatment is one adapted to the stage of the disease when the patient presents herself. It has to be admitted that little or nothing is known of any prophylaxis. But if the condition called by various authors cystic mastitis or Schimmelbusch's disease is properly appreciated as a precancerous state, the incidence of cancer of the breast will diminish. Further, if the public is educated, without alarm, to the significance of a mass in the breast, and if medical practitioners realize that it is unwise to make histological diagnoses by palpation alone, the number of patients seen in Stage I will be greatly increased and the ultimate cure rate higher. The fate of the cancer patient is often in the hands of the first doctor consulted.

Stage I of Steinthal.

In the routine treatment in an early case (Stage I of Steinthal: "A movable tumour without signs of distant spread") there has been adduced no statistical evidence which, in the present state of our knowledge, justifies us in substituting any form of treatment for that of a radical operation of the Halsted type. Preoperative irradiation three to four weeks before operation is, however, to be advised on theoretical grounds as being likely to improve the results obtained from surgical operation alone. There is statistical evidence which would appear to support this statement. It does not seem to be definitely established that in an early case of breast cancer postoperative irradiation will improve the results.

Stage II of Steinthal.

In Steinthal's Stage II ("of a movable tumour with clinically demonstrable regional glandular metastases") preoperative and postoperative radiation should be auxiliary methods to the radical operation. In Stage II we are dealing with a cancer

[1] An abbreviated form of the paper read at the Second Cancer Conference, Canberra, March, 1931.

that has widely spread; it is impossible to gauge its limits or extent. Postoperative deep X radiation may destroy cancer cells which may have been left behind or which are beyond the reach of the scalpel. It is thus complementary to the preoperative irradiation.

Stage III of Steinthal.

In Steinthal's Stage III ("of a fixed tumour with or without clinically demonstrable metastases, or of a tumour with clinically demonstrable distant metastases") a radical operation is contraindicated. There is, however, in some instances a place for amputation of the primary cancer lesion after preoperative radiation. Radiation is capable of rendering an inoperable cancer of the breast operable. Further, in scirrhous cancer the primary lesion is more highly radio-resistant than the metastases, so that metastases may be made to disappear, while the primary scirrhus, although reduced in volume, remains like a non-extinct volcano. A microscopical section will then show cancer cells lying in ambush in a thicket of fibrous tissue, quiescent but still malign.

Local Recurrences.

The treatment of local recurrences may in some cases be surgical. Surgical operation, however, is useless for nodules at the extremities of the first, second, third or fourth intercostal spaces. For supraclavicular glands surgical excision should be followed by X radiation. These recurrences are usually radio-sensitive and respond well to either embedded radium tubes or to radium on moulds at a distance of three or more centimetres. They do well also with deep X radiation, which has these advantages, that it covers a wider field and the patient does not need to be placed in hospital. This makes for earlier treatment. In practice it is found that a method of radiation that can be carried out in the out-patient's department is of the greatest value, for in this manner there is no so great a waiting period prior to treatment.

Secondary Metastases in Bone.

Deep X radiation is of great value in relieving the sufferings of patients in whom there is malignant invasion of the vertebræ or pelvis. In some cases the irradiation acts like a charm and has so rapid a response as to render difficult any explanation of its action.

What is the Present Place of Radiation in the Treatment of Cancer of the Breast?

The resort to radiation methods proceeded from a desire to improve the results obtained from operation alone. It was felt that the radical operation had attained its highest degree of perfection as a therapeutic procedure and yet the percentage of three year survivals remained only at about 48 (Handley). The figures for five year survivals are, on the whole, poor, excepting always those cases in which the disease was treated at a very early stage. At the Mayo Clinic any improvement in the figures for recent years is attributed to the precocity of treatment which has followed education of the people. The theoretical justification for preoperative radiation rests in part on the classical experiment of Murphy and others at the Rockefeller Institute. It was there shown that a fragment of mammary cancer taken from a mouse, then irradiated with a "cancer dose" of irradiation, and later grafted under the skin of another mouse, grew as easily as a non-irradiated graft from the same tumour. But if a non-irradiated fragment from the same tumour were grafted under the skin of a region previously submitted to irradiation with an erythema dose, the graft failed in 70% of cases. It is necessary to say that Lacassagne and others have failed to confirm these experiments.

Secondly, preoperative irradiation permits the taking of a biopsy without the risk of giving a *coup de fouet* to the malignant process or of causing cancer implantation in the skin wound. Thirdly, a practical experience of this method would seem to justify us in saying that it improves our results, lessening the number of recurrences and lengthening the interval of freedom when recurrence does take place. Further, it diminishes the peritumoural infiltration and may render operable what was previously an inoperable condition. The lessening of the virulence of the growth takes away the danger of dissemination, which is a risk in all operative intervention.

Postoperative radiation does not claim to prevent the development of cancer by its influence on normal tissues, but is credited with having a beneficial effect because of its action on any cancer cells which have been left behind at the operation and which have not yet become visible or appreciable as definite metastases. According to Forsell's view, a malignant formation in this stage of development, where a macroscopical tumour has as yet not become organized, reacts to irradiation in a manner different from that observed in cases of fully developed metastases. It is assumed that in any but the earliest stage of mammary cancer the surgical act cannot be performed without great risk of dissemination. Obviously such dissemination is in inverse proportion to the competency and gentleness of the surgeon. It is almost impossible for the operator to avoid sowing some seeds in the newly ploughed field. But do the benefits conferred outweigh any possible untoward effects?

The evil effects alleged are: (i) that a stimulus may be given to quiescent cancer cells; (ii) that the lung is often damaged, the so-called "pulmonary induration" of Wintz; (iii) that the general health of the patient is affected, and particularly her blood condition changed for the worse (*cachexie de Röntgen*); (iv) that æsthetically the results are bad because of pigmentation, atrophy of the skin and often telangiectases.

The reply to these criticisms is that X rays cannot sow cancer cells and cannot stimulate them. It is possible, however, with faulty technique to

lower the resistance of healthy tissues so as to permit their being rapidly overrun in a whirlwind fashion by the cancer process. The skin of the chest in those treated may suffer pigmentation and atrophy; these are minor disadvantages if the good effect is admitted. The health of the patient may be affected by X radiation whence it is necessary to make preliminary and repeated blood examinations.

The main charge, however, is that in which the radiotherapist is accused of damaging the underlying lungs. It is to be admitted that with the early use of massive doses of deep X radiation instances of such injuries to the lungs were not rare. In all techniques the lung receives an important amount of irradiation. Safety is found nowadays in the fractioning of doses and in the use as far as possible of a tangential irradiation. There remains, however, always the personal factor; the careless radiotherapist, like the rough-handed surgeon, may cause grave mischief. It should be insisted that before any deep X radiation is given, a radiograph of the chest be taken in order to make sure that there is a normal pulmonary transparency. When latent or active pleural or pulmonary lesions are present, irradiation may quicken the evolution of bacillary processes. Both Solomon and Belot in France were unable to find examples in their experience of a previously healthy lung having been damaged by the method of gentle and repeated doses which they use. In most of the patients whose clinical histories are brought as evidence against deep X radiation, the condition is really one of pleural propagation of the malignant disease.

Opinions as to the value of postoperative preventive X radiation vary greatly. Regaud is not convinced of its value, and Roussy adopts a neutral attitude. At the Mayo Clinic the therapy is used, but it is not considered that its use influences greatly the results. Jüngling, of Tübingen, in 1926 reported the result of his inquiries from twenty-five German and Austrian clinics as to whether postoperative irradiation was being used. Ten of the clinics no longer used it, ten adopted it as a routine in all cases, and five employed it in advanced cases only or at the expressed wish of the patient.

If there exists any doubt as to the value of postoperative preventive deep X radiation, there can be none as to its beneficent effects in local and distant recurrences and in the inoperable cases. A just evaluation is that preoperative and postoperative irradiation in the hands of expert radiotherapists is capable of improving the results from operation alone, while in inoperable cases and in the presence of local or distant metastases it can prolong life and give valuable alleviation. A complete cure from deep X radiation must be of rare occurrence.

Along What Lines Can We Expect a Progress Towards Better Results from Treatment?

We must seek to fit the therapeutic method to the particular histological type. "Cancer of the breast" is a generic term for a large number of widely dissimilar neoplasms. It is surely irrational to use a rule of thumb method for the treatment of such different growths. It is necessary, if we are to extend the treatment by radiation methods, to set up a new classification and a new nomenclature in breast cancer based on the response to irradiation. We shall need to seek in the cell and in the stroma for signs upon which we can base a prognosis and estimate the radio-sensitiveness of a particular tumour. A preliminary biopsy therefore becomes an essential preliminary to treatment, and the use of preoperative irradiation will remove any danger from the procedure. The experience of Wintz has proved this. The primary lesion in mammary cancer is easily accessible, but the wide area over which cancer cells may have been strewn, the richness in blood and lymph vessels, and the difficulty of administering a strong and even dose over an undulating surface which has a varying depth of tissue, make the proposition for the radiotherapist far from easy. Yet Regaud says that "reservation made for lymphatic and blood stream spread, a good number of the malignant epithelial tumours of the breast are sufficiently radio-sensitive to be curable by radiation." A great disadvantage in breast cancer is the tendency for it to infiltrate neighbouring fat tissue. The poor blood supply of this tissue renders the invading growth radioresistant, and heavy radiation may lead to fat necrosis. The stroma then fails in its duty. There is so wide a variation within the limits of each type that any general statement can be considered as only approximately true.

1. The adenocarcinoma is not as a rule suitable for radiation. The more cystic it is, the less sensitive. A high proportion of the successful surgical results are obtained from this cancer.

2. The medullary or encephaloid carcinoma is sensitive to irradiation. This growth and the true sarcomata of the breast may be the first types of malignant mammary disease in which operation will be contraindicated.

3. In regard to acute carcinosis, the tumour cells are highly sensitive, but the effect of irradiation is at best temporary and may hasten the inevitable end because of the toxic effect of the large number of cancer cells destroyed. In our present knowledge neither surgery nor radiation is indicated.

4. Radiation finds scirrhous carcinoma a somewhat refractory cancer, and since surgical operation has also many failures here, the association of both methods is advisable. The conception of setting up a "barrage" by radiation is an entirely wrong one. Cancer cells must always be directly destroyed. In the scirrhus, after irradiation alone, actively malign cells can be seen microscopically, infested by fibrous tissue, but unsubdued. The local and distant recurrences of scirrhous carcinoma are more sensitive than the primary lesion. *Cancer en cuirasse* and the *peau d'orange* condition do not react well to radiation.

5. Fibro-carcinoma following chronic mastitis is, like the scirrhus, a difficult proposition for radiotherapy. The combined method of interstitially applied radium and deep X radiation or radium on surface moulds is alone capable of delivering the necessary dose.

6. The mucoid carcinoma is relatively benign and radio-resistant, so that surgical operation is indicated. It is an axiom that secreting cells are radio-resistant.

There are other purely clinical factors to be considered. The thin woman with a small breast is more suitable for radiation than the fat patient with voluminous mamma. The very young patients who suffer from cancer of the breast do badly, no matter how they are treated.

CARCINOMA OF BREAST TREATED BY RADIUM: A SHORT CLINICAL EXPERIENCE.

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DURING the past eighteen months the Cancer Committee of the Adelaide Hospital has cooperated with the surgical staff in the treatment by radium of several patients with carcinoma of the breast, and the purpose of this communication is to describe the technique adopted and to indicate the immediate effects of radiation which have been observed.

The series of patients represents no specially selected group and includes those with both surgically operable and inoperable conditions. The clinical diagnosis of carcinoma has been considered fairly certain in each instance, but histological confirmation has not been obtained in every one, although in the present state of our knowledge of radium treatment such confirmation is considered advisable in every case if possible.

An endeavour has been made to adhere to the general principles of interstitial radium treatment advocated by Dr. Burrows, and the actual technique used follows closely the method described by Keynes for the treatment of carcinoma of the breast.

Technique.

The interstitial method has been employed in each instance, but this has been supplemented in some cases with secondary treatments by a modified distance technique.

Interstitial Application.

The radium used has been in platinum needles of wall thickness 0·5 millimetre, and the radium strength has been one and two milligrammes per centimetre of active length of needles. The double strength needles containing two milligrammes per centimetre have been used only in the tumour itself, while the unit strength needles have been reserved for insertion into the lymph drainage areas. The lengths of needles used have been two, three, four and five centimetres active length. The two-centimetre needles were used for the intercostal spaces, the supraclavicular and infraclavicular fossæ and the axillæ; the three-centimetre needles were inserted into the subpectoral region and into tumour substance; and the four- and five-centimetre needles were reserved for tumour substance only. The needles have been inserted so that they lie as nearly as possible parallel to their immediate neighbours in order to avoid excessive radiation following on the crossing of needles. The distribution of radium in the lymph drainage areas has been a constant factor, and comprises a two-centimetre needle in the anterior ends of each of the upper four or five intercostal spaces on the homolateral side, two two-centimetre needles in the infraclavicular fossa, one two-centimetre needle in the supraclavicular fossa, three two-centimetre needles in the axilla, and three three-centimetre needles inserted under the lateral border of the pectoral muscle. In irradiating the tumour an attempt has been made to apply at least one milligramme per cubic centimetre of tumour substance. The needles have been arranged to include an area somewhat larger than the tumour, and in treatment of large tumours the needles have been arranged in superficial and deep layers parallel to one another.

The time of irradiation has been from seven to ten days, and the dose in milligramme-hours has varied considerably according to the size of the tumour.

Distance.

The technique used for surface applications has been a constant factor. The moulding substance is "Columbia paste" (a mixture of paraffin, beeswax and sawdust). It is malleable at a temperature of about 54·4° C. (130° F.) and is suitably moulded to the body outlines. It is light in weight and gives rise to a minimum of secondary irradiation. The mould is made two centimetres in thickness and it is cut to the approximate shape of, but slightly larger than the area to be treated. Its area is measured accurately and the radium is distributed evenly over its surface until there is present one milligramme per square centimetre of area. In practice slightly greater concentration is allowed over the tumour than over the lymph drainage areas. The radium is usually in the form of five and ten milligramme tubes and the filtration varies from 0·5 to 1·0 millimetre of platinum or its equivalent. The heavier filtration is deemed advisable, but in practice it is not always possible to obtain the appropriate apparatus. The mould is retained in position over the breast and lymph drainage areas by means of suitable bandages for a period of seven days.

Patients Treated.

The following is a *résumé* of patients treated from August, 1929, to January, 1931:

Of the five patients who have been treated for ten months or more, one (Case I) had an advanced chronic growth, and the growth is now in, at any rate, a temporarily arrested state, the patient is in good general health and able to do her ordinary housework; one patient (Case II) who had an acute carcinoma of lactation has died.

Three patients (Cases III, IV and V) could be regarded as having operable growths; they are all in excellent general health and are able to do their normal work; no signs of glandular or general metastases are apparent, and their local lesions have retrogressed into what is apparently an ill-defined scarred area in the breast. Cases VII and VIII are merely included to show minor differences in distribution of radium according to the extent and site of the lesion and to complete the series treated up to the end of 1930.

CASE I.—E. P., number 31, was aged forty years, single. In July, 1929, there was a large scirrhous mass involving the whole right breast which was firmly fixed to the thoracic wall and there were several skin nodules extending to the mid-line. The skin was deeply puckered over the tumour. There were small, hard, enlarged glands in the right axilla and supraclavicular region and there was swelling of the right arm. Microscopical section of a skin nodule showed a deposit of carcinoma. The condition was inoperable.

Radium treatment was commenced on August 3, 1929, by needles in breast, 54 milligrammes, it was continued for

seven days—9,072 milligramme-hours. Supplementary treatment with a Columbia paste mould was applied to the supraclavicular and infraclavicular regions on October 14, 1929. The area of the mould was 44 square centimetres, it was of unit strength, two centimetres thick, and was applied for seven days—7,392 milligramme-hours. A similar mould was applied on October 29, 1929, to the right axilla—7,392 milligramme-hours. Six weeks later the tumour had shrunk considerably and was more movable on the chest wall. There had been a good skin reaction from treatment. The patient has been under constant observation for the past year.

The breast settled down into a puckered scarred mass which is tethered to the chest wall, though it can be moved on it, and there has been no evident activity of growth locally or in the glandular areas which merely show a slight general thickening. The swelling in the arm is less than before. The skin nodules disappeared with treatment and have not recurred.

This was an advanced case which would rapidly have ulcerated and it has at the least been kept perfectly quiescent for fifteen months, and the patient's general health is at present excellent.

Case II.—E. M. C., number 91, aged thirty-five years, married, had had a carcinoma of the pelvic colon removed a year previously. In September, 1929, she had an extensive fungating mass involving the whole right breast, and a large mass ten centimetres in diameter in the left breast and extensive glandular deposits in both axillæ and supraclavicular regions. She had noticed a small lump in the right breast just before the birth of her child and it was a virulent type of carcinoma of the lactating breast and, of course, inoperable.

On October 3, 1929, 127 milligrammes of radium were inserted in needles in and around the right tumour for three and a half days, giving 10,032 milligramme-hours; and on October 8, 1929, 86 milligrammes were inserted into the left breast for four days, giving 8,256 milligramme-hours. A smart reaction occurred and the patient became dangerously ill. She was taken from hospital and died on December 25, 1929, from metastases in the lungs.

Case III.—F. P., number 330, aged about forty, married, in March, 1930, had a hard scirrhous tumour in the upper outer quadrant of the left breast approximately five by six centimetres. The skin over it was dimpled, but the pectoral fascia was not markedly adherent. The left axillary glands were slightly enlarged. A biopsy revealed carcinoma. An X ray examination of the chest revealed no metastases.

On March 17, 1930, radium needles were inserted for ten days, distributed as follows: 7,680 milligramme-hours in the left breast, 1,440 milligramme-hours along the border of the pectoral muscles, 1,340 milligramme-hours in the left axilla, 1,440 milligramme-hours in the supraclavicular and infraclavicular regions, 1,920 milligramme-hours in the upper three intercostal spaces. A good reaction was present in two weeks, especially marked round the biopsy wound, and in three months the reaction was disappearing, the tumour lessened in size with a firm movable nodule under the biopsy scar.

On July 2, 1930, a mould of unit strength, 60 square centimetres in area, two centimetres deep, with needles placed concentrically over the growth was applied for seven days—10,080 milligramme-hours. A moderate skin reaction followed. Three months after this, on October 2, 1930, the tumour had become very much smaller and indefinite in outline, and in February, 1931, it was reduced to merely an indefinite induration at the site of the tumour.

Case IV.—A. T., number 339, aged fifty-nine, married, had three children, the youngest being thirty-three years of age. In April, 1930, she had a hard scirrhous mass, five by three centimetres, in the upper outer quadrant of the right breast, attached to the skin, and tethered to the pectoral fascia. There was marked nipple contraction. There were no metastases apparent in a skiagram of the chest. No glandular enlargements were felt. The growth could be classed as operable. No biopsy was taken.

On April 16, 1930, she had radium needles inserted in the following distribution for ten days: 9,408 milligramme-hours in the right breast, 2,160 milligramme-hours along the border of the pectoral muscles, 2,160 milligramme-hours in the right axilla, 1,440 milligramme-hours in the supraclavicular and infraclavicular region, 1,440 milligramme-hours in the upper three intercostal spaces. This was followed by a good skin reaction, and in November, 1930, the tumour was greatly diminished in size. On December 9, 1930, a supplementary mould treatment was applied over the right axilla. A mould of unit strength, 60 square centimetres in area, two centimetres deep, was applied for seven days—10,080 milligramme-hours. This was followed again by a slight skin reaction.

In February, 1931, there remains only an indefinite induration at the site of the tumour. It is tender to palpation over the affected lobule distal to the site of the tumour. No glands are palpable. Her general health is excellent.

Case V.—D. M., number 447, aged about thirty-eight, married, in May, 1930, had a scirrhous mass three centimetres in diameter in the upper inner quadrant of the left breast, with an overlying separate nodule to its lateral side. The nodule was one centimetre in diameter. The mass was tethered but not fixed either to the skin or pectoral fascia. The axillary glands were not palpable. This growth was considered operable.

On May 28, 1930, radium needles were inserted for ten days in the following distribution: 10,080 milligramme-hours in the left breast, 2,160 milligramme-hours along the pectoral border, 1,680 milligramme-hours in the left axilla, 1,680 milligramme-hours in the supraclavicular and infraclavicular regions, 1,220 milligramme-hours in the upper three intercostal spaces. Three weeks later there was a good skin reaction over the tumour which appeared movable.

The patient lived in the country and was unable to report owing to her work and for financial reasons, but nine months later she reported by letter that she was in excellent health, and could only feel a very small "lump" at the site of the original lesion.

Case VI.—J. T., number 605, aged about thirty-five, married, in October, 1930, had a large mass involving the major part of the left breast which was lactating. There was œdema of the overlying skin and the mass was fixed to the pectoral fascia. The condition was inoperable. No biopsy was obtained.

On October 10, 1930, radium needles were inserted for seven days as follows: 13,770 milligramme-hours in the left breast, 1,350 milligramme-hours in the left axilla, 675 milligramme-hours in the supraclavicular and infraclavicular regions. In three weeks there was bronzing of the skin of the breast and of the face; and this was followed by marked reddening and desquamation over the breast. In six weeks the tumour had practically disappeared, but metastases had appeared in the left pectoral and supraclavicular glands, numerous nodules in the right breast and a deposit in the neck of the right femur. Later a nodule appeared in the area of skin on the left chest between the area of treatment in the breast and axillary fold.

A pathological fracture occurred in the neck of the femur on November 28, 1930, and she died on February 19, 1931, of generalized metastases, the primary lesion in the left breast having remained completely resolved.

Case VII.—N. K., number 665, aged forty-four, single, had in December, 1930, a large mass involving most of the right breast and six centimetres in diameter. There were œdema and infiltration of the skin, but it was not markedly fixed to the pectoral fascia. There was a blood-stained serous discharge from the nipple. Enlarged glands were palpable in the right axilla and in the supraclavicular region. Her condition could be classed as a borderline one as regards operative removal, but with a bad prognosis.

On December 10, 1930, radium needles were inserted in the following distribution for ten days: 17,520 milligramme-hours in the right breast (arranged concentrically), 2,400 milligramme-hours in the intercostal spaces. On December 9, 1930, this was supplemented by needles for seven days: 3,000 milligramme-hours in the supraclavicular and infraclavicular regions and axilla. There was insufficient radium available for the whole treatment to be carried out at one time. The reaction was well established in one month, and in two months the breast was much smaller in size. Three months after treatment there was still some reaction around the nipple, but the tumour had practically disappeared and the breast was almost normal in size, being only a little more diffusely indurated than the opposite normal one. There was an indurated area under a scar where a small incision had been made for the removal of a needle. Supraclavicular swelling was still present, but this was less than before the original treatment. Further radium administration by means of a mould will probably be necessary.

Case VIII.—E. B., number 681, aged sixty-two, married, in December, 1930, had a hard scirrhous mass in the upper and outer quadrant of the right breast. The mass was five centi-

metres in diameter. Fixation to the skin and retraction of the nipple were present, but the mass was not fixed to the pectoral fascia. No glands were palpable. The condition was considered operable.

On January 2, 1931, radium needles were inserted for eight days in the following distribution: 11,520 milligramme-hours in the right breast, 1,152 milligramme-hours in the anterior axilla, 1,920 milligramme-hours in the upper three intercostal spaces. One month later there was a good reaction, and in two months the tumour was definitely smaller, but still palpable. It is intended to treat the supraclavicular and infraclavicular regions and axilla with a mould treatment, when the present reaction over the breast has subsided.

Reports of Cases.

ENDEMIC AMŒBIC DYSENTERY.

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Toowoomba, Queensland.

As endemic amœbic dysentery is not frequently recorded in Australian medical literature, the following notes of a man who contracted the disease while living on the Darling Downs, Queensland, are published.

E.H., a male, aged thirty-six years, is a farm worker in the Pittsworth district. He has lived on the Downs all his life and except for a fortnight's holiday in Brisbane in 1926 and a short visit to Sydney in 1930, has never been away from the Downs. His health was good until November, 1930, when he had an attack of pain in the right hypochondrium, lasting for three days, accompanied by jaundice which lasted for several days. Immediately following this sickness the patient noticed that his motions became more frequent (up to five daily), that they were loose and contained a lot of mucus. The diarrhœa continued with slight remissions until March 9, 1931, when he sought medical advice and was admitted to Saint Vincent's Hospital, Toowoomba. Prompt relief was afforded by antiseptic colonic douching. Whilst in hospital, the patient was examined by X rays after the administration of a barium enema. The film showed distortion of the shadow of the colon in the region of the right colic flexure. He was discharged completely relieved within a week of admission and instructed to return in a month's time.

The patient returned and was readmitted on April 21, 1931. He was rather thin, but no abnormalities were found on physical examination. He stated that the diarrhœa and passage of mucus had begun again shortly after his discharge from hospital and had continued the same as before. In a routine examination of the stools great numbers of amœbæ were found which were identified as *Entamœba histolytica*. A course of treatment with bismuth emetine hydrochloride was instituted and the diarrhœa quickly ceased and the stools became formed. The patient has not had any recurrence of the diarrhœa for the past three months, he has put on two stone in weight and feels very fit. Three examinations of the stools at monthly intervals after a saline purge have not revealed any cysts or amœbæ.

Acknowledgement.

I am indebted to Dr. R. Y. Mathew, of the Commonwealth Health Laboratory, for his assistance in this case.

Reviews.

THE ÆTIOLOGY OF ABDOMINAL PAIN.

Despite the fact that much has been written on the ætiology of abdominal pain in recent years, the attention of the thoughtful student is arrested by the appearance of any new observations and theories on this important topic. In a small book, entitled "Abdominal Pain," Dr. John Morley deals at some length with the evolution of our knowledge of this subject.[1] While paying due deference to Sir James Mackenzie for his epoch-making work on referred pain, he refuses to accept the theory of the viscero-sensory and viscero-motor reflexes. He distinguishes true visceral pain, such as that in intestinal colic, from the pain felt over an inflamed gall bladder. The latter cannot be regarded as referred pain, but is, he thinks, due to direct stimulation of the afferent nerves in the parietal peritoneum. These nerves are somatic and hence are capable of transmitting accurate localization of the site of the lesion, in contrast to the visceral afferents which localize indefinitely only such stimuli as are produced by raised tension in the viscus.

The fact that the gut is insensitive to cutting and burning seems to Dr. Morley to preclude its afferent nerves from taking part in a viscero-sensory reflex, that is, referring pain to the skin where such stimuli are pain-producing. He holds that the theory of referred pain from viscera to skin is wrong.

In a series of observations on living patients during operations under local anæsthesia he has reached the conclusion that the parietal peritoneum is sensitive to slight stimuli and is responsible for the localized pain and tenderness found in intraabdominal lesions. The peritoneo-cutaneous and peritoneo-muscular reflexes are invoked to explain the skin tenderness, and hyperæsthesia and the muscular rigidity observed, for example, in acute appendicitis.

The author stresses the importance of shoulder tip pain as a sign of diaphragmatic irritation. This is somatic in origin, referred by way of the phrenic nerve. With this most observers will agree. It is a true somatic referred pain, having nothing to do with visceral disease unless the latter affects the diaphragmatic peritoneum. Infiltration of the shoulder tip with "Novocain" causes the disappearance of the pain.

The problem of deep tenderness in gastric ulcer is also investigated. The author believes that the accurate localization of the tenderness over the site of the ulcer cannot be explained by reflex radiation through splanchnic nerves, as Mackenzie maintained, but that it is brought about by contact of the ulcer with the parietal peritoneum at the time of examination.

The pain experienced when the mesentery is handled is also explained as a parietal peritoneal irritation by postulating that the mesentery is an infolded piece of the original somatopleure and its Paccinian corpuscles are similar to those found in the peritoneum lining of the abdomen and in tendons and other somatic structures.

The observations on patients subjected to gastro-enterostomy and other major procedures under local anæsthesia have provided a number of facts not explicable in terms of the Mackenzie theory. Whilst in agreement with Dr. Morley that many vascular pains are due to irritation of somatic nerves, we feel that he dismisses the autonomic system too lightly. However, it may be that blood vessels in the mesentery are supplied by somatic nerves, as they undoubtedly are in the extremities.

The localization of pain in the fixed parts of the colon, the ureter and renal pelvis is regarded by the author as evidence of these structures possessing somatic sensory nerves. This is quite feasible and seems to have a definite anatomical basis. The silent area of Zachary Cope is not so silent according to Dr. Morley.

Most clinicians are agreed that the time has arrived for a reconsideration of the problem of abdominal pain in the light of the accumulated observations by different workers in recent years.

It is obvious that the Mackenzie theories, though a useful introduction to the subject, were not correct in every detail.

[1] "Abdominal Pain," by John Morley, Ch.M., F.R.C.S., with an introduction by J. S. B. Stopford, M.D., F.R.S.; 1931. Edinburgh: E. and S. Livingstone. Demy 8vo., pp. 206, with illustrations. Price: 10s. 6d. net.

While the evidence presented in this book seems convincing, we hesitate to accept the new theories as the final word. At the same time it appears to be the best statement of the position today. The book can be recommended to students and practitioners, and doubtless it will stimulate reflection on a subject which, though commonplace, is of such vital importance that any advance is welcome.

HUMAN EMBRYOLOGY.

THE medical curriculum has in later years been extended so much to try to keep pace with the rapidly increasing mass of facts which it is thought necessary to impart to medical students, that any attempt to make them easily understood and rapidly assimilated is appreciated. Any new text books on the basic medical sciences will therefore be carefully scrutinized. This is particularly true in regard to new text books on embryology, for good elementary treatises on this difficult and important branch of anatomy, which present the essential facts succinctly and effectively, are few.

With regard to C. S. Simkins's "Textbook of Human Embryology," the author is to be especially commended for the simple and lucid way in which he presents his subject, and it is quite evident that the book has been carefully prepared by a skilled and experienced teacher.[1] The subject matter is quite up to date, all the latest works of any importance being freely drawn on, not only for newly discovered facts, but for suitable illustrations. Although most of the separate sections of the book are well treated, special mention must be made of the chapters on the origin of the nervous system, on the development of the urogenital system, and on the vascular system. The chapter on the cyclical phenomena in the female tract is also worthy of special comment, for, although it is concise, it is quite adequate and up to date. Some of the other sections appear at first sight to be treated a little too briefly. This is so, for example, with regard to the chapter on teratology and the chapter dealing with the purely cytological aspects of the subject.

The figures are carefully chosen and are well reproduced. A special feature, and one highly commendable, is the accompanying keys to some of the figures. Many figures also, although copied from well known figures which have appeared elsewhere, are made more simple without detracting from their accuracy. Another pleasing feature of many of the illustrations, and one that makes for economy in time, is that the parts are labelled in the plates instead of by letters referable to legends below the plates. As an aid to rapid revision and recapitulation many useful tables and summaries are given. As is often the case in the first edition of any text book, one or two mistakes are noticed. For example, in the table on page 98 the diencephalon is made a part of the mesencephalon, although the true relation is made quite clear in the text. On the whole the work is an excellent student's text book and is highly recommended.

PROGRESS IN SURGERY.

THE volume on general surgery of the "Practical Medicine Series," from the press of The Year Book Publishers, Chicago, consists of 804 pages and an index.[2] It is edited by Professor E. A. Graham, of Washington University.

This volume is a stimulating production, containing extracts from the surgical journals of the world. It deals solely with the advanced work of the many masters in their craft. The conclusions will not always be accepted as proven, but they will always be read with respect. Much of the matter, with fuller knowledge, may find other explanations than those advanced at the present time, and much may be proved to have been founded on erroneous observations or false premises; yet the value of the volume is undiminished, new ideas are promulgated and old thoughts are directed along new channels.

The editor himself sometimes disagrees violently with some of the conclusions, yet he gives them place. This eminently fair method of dealing with the contributions of other surgeons of other countries is to be commended, and adds to the value of the volume.

One is sometimes appalled at the world statistics on some subject, and in this respect we cannot silently pass over the unnerving death rate of "Avertin," now becoming fashionable. It is easily "The Captain of the Men of Death" in the anæsthetic world, being nine times more deadly than chloroform and twenty-five times more than ether. Even allowing a fair margin for the accidents of unfamiliarity, an anæsthetic of this type does not appear to have the required degree of safety.

We do not wish to be captious in dealing with this work, but the missed pronouns and the contracted words are sometimes irritating. We are certain that any one interested will be amply repaid by the perusal of this book.

BRAIN TUMOURS.

IN "The Diagnosis and Treatment of Brain Tumors" Ernest Sachs, of St. Louis, has published a most useful and readable book.[1] Owing to the enormous amount of recent literature on neurology and the many controversial points in the study of the physiology and pathology of the brain, no single book could do more than give an outline of the modern views and practice. This the author has done, and the chief attraction of the book lies in the very extensive references to the literature with which he has supplemented the views expressed in the book. The bibliography alone would make this book of great value and interest to any practitioner concerned with neurology.

The section on neurological examination describes the routine methods of examination as used in most of the American clinics, and, in common with the rest of the book, is excellently illustrated. No mention is made of the use of Bjerrum's screen in perimetry, which gives far more detail in early and slight field defects than do the perimeters mentioned. The uses and dangers of cerebral pneumography are fully discussed, but little reference is made to the indications and limitations of encephalography.

In the chapter dealing with surgical pathology the author adheres to Penfield's modification of the classification of brain tumours of Cushing and Bailey, and gives a simple and clear account of the histopathology of brain tumours. Signs and symptoms of general increase of intracranial pressure are well described, with the pathological basis of causation of each, as far as is known. But not all will agree with the statement that a double *abducens* palsy always indicates a lesion of the pons, for it frequently occurs, as does the single *abducens* palsy, simply as a sign of general increased intracranial pressure.

Numerous cases are quoted to illustrate the typical localizing signs and symptoms of tumours in the various regions of the brain, and also to indicate the types of tumour which are scarcely capable of localization without the aid of pneumography. The section on treatment and operative technique is necessarily short, but emphasis is laid on the special methods by the use of which Cushing and others have been able to lower the mortality rate to well below 10% and to raise so greatly the possibilities of successful removal of tumours.

The book is well set up and the reproduction of X rays is excellent. Not the least attractive feature is the prominence given to the work of the leading British clinical neurologists. The book is indispensable to a student of neuro-surgery.

[1] "Textbook of Human Embryology," by C. S. Simkins, Ph.D.; 1931. Philadelphia: F. A. Davis Company. Royal 8vo., pp. 483, with 263 illustrations, some in colour. Price: $4.50 net.

[2] "The Practical Medicine Series: General Surgery"; Series 1930. Chicago: The Year Book Publishers. Crown 8vo., pp. 848. Price: **$3.00 net.**

[1] "The Diagnosis and Treatment of Brain Tumors," by E. Sachs, A.B., M.D.; 1931. St. Louis: The C. V. Mosby Company. Crown 4to., pp. 396, with 224 illustrations, including ten in colours. Price: **$10.00 net.**

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ON LAUGHTER.

Laughter, like good wine, is a gift from the gods. It is possible to pass through life and not to know the joys of either; and for one who achieves such a distinction nothing but sorrow mingled with pity can be felt. At the same time man may find it necessary to dispense with wine and, for one reason or another, may become incapable of laughter. These are hard times and men are wearing an unwonted mask; this mask, like a growing sickness, has made them gloomy and dour, and they wonder, sometimes without hope, when the returning glow of health will restore them to their former state. It is thus not unseemly to pause awhile and to consider whence laughter springs, how it resembles the fruit of the grape, and what it can do for those who capture it.

If a physiologist were asked how laughter comes, he would probably talk of afferent stimuli from eye or ear, of brain centres, or efferent stimuli, of coordinated action of certain muscles and what not. The physiologist may for the nonce be put on one side. On the psychological side the first requisite to healthy normal laughter is a sense of humour, an ability to appreciate the ridiculous. Without this a man cannot enjoy "honourable" laughter. Though a sense of humour is essentially an individual quality, there is without question such a thing as a national sense of humour. What appears ridiculous to an Englishman may arouse no emotion in a German or a Scotchman; what is ludicrous to an Australian may be quite flat and uninteresting to a Frenchman or an Italian, and so on. A medical practitioner, a Scotsman, who appears to be quite normal, and who actually is a delightful person, on reading the libretto of "The Pirates of Penzance" for the first time, asked in amazement whether there were grown-up people who took "this sort of thing seriously." This attitude was probably individual, and not the reflection of a national characteristic. A man has no right, therefore, to arrogate to himself or to those who share his tastes the sole possession of a sense of humour. He must recognize in others a different viewpoint, arising sometimes from a different sense of the fitness of things, which is the result of upbringing, of immediate environment or of national character. Even with this allowance, some individuals remain whose stolidity is unbroken, and whose existence is redolent of the cabbage patch. These are they who call forth sorrow and who are deserving of pity. If a sense of humour is the first requisite to healthy laughter, the other essentialities are something to laugh at and a mind not preoccupied by egotism or worried by grief or adversity.

Laughter has been coupled with wine as a gift from the gods. Wine varies in colour, in bouquet and in flavour. It may be sweet or dry, heavy or light, still or sparkling. It may be sour. Even effervescence, that quality which is supposed above all others to bring joy to the heart of man and maid, may be cheap, nasty and the result of an inferior process. So with laughter. There is normal, healthy laughter and there is laughter pathological. We all know and love the happy laughter of children. The laughter of youth, bright, clear, fresh and scintillating, awakens sympathy, if not reminiscence. The full-throated laughter of the normal man or woman is like a wine well matured and served at the right place on the menu. There is also the "hearty," infectious laugh of the *bon viveur*, ample as his frame, welling up from the depths of his interior. And there is the peaceful laugh of age, the laugh of

knowledge and contentment. There are many other kinds of laughter. There is the laugh of wisdom and the stupid laughter of the crowd. As Meredith writes:

> This laughter of reason refreshed is floriferous, like the magical great gale of the shifty Spring deciding for Summer. You hear it giving the delicate spirit his liberty. Listen, for comparison, to an unleavened society: a low of the udderful cow past milking hour!

There is "the loud laugh that spoke the vacant mind," described by Oliver Goldsmith, and there is the laughter of the fool, likened by King Solomon in the book of "Ecclesiastes" to "the crackling of thorns under the pot." But there is no need to extend the list.

Apart from revealing man as he is to those around him, laughter may act as a corrective. To quote Meredith again:

> Comedy . . . it is who proposes the correcting of pretentiousness, of inflation, of dulness, and of the vestiges of rawness and grossness to be found among us. She is the ultimate civilizer, the polisher, a sweet cook . . . . Comedy is the singular scene of charity issuing of disdain under the stroke of honourable laughter.

This in the language of the medical practitioner's consulting room may be termed objective laughter. For "subjective" laughter not only a mental, but also a physical effect has been claimed. If wine and laughter are similar in some respects, they differ in others. The *bon viveur* knows that wine, mellowed by age though it be, may on certain occasions make him "liverish." Let him then betake himself to the hearty laugh. Laurence Sterne, at any rate, thought that the exercise would be valuable, for he makes Tristram Shandy say in 1759 that he wrote his "Life and Opinions" ". . . against the spleen! in order, by a more frequent and a more convulsive elevation and depression of the diaphragm, and the succussations of the intercostal and abdominal muscles in laughter, to drive the *gall* and other *bitter juices* from the gall-bladder, liver, and sweetbread of his majesty's subjects, with all the inimicitious passions which belong to them, down into their duodenums." Whether, therefore, like Timothy, we take a little wine for our "stomach's sake" and our "often infirmities," or whether we forbear, let us take to laughter. Incidentally, let us remember that there is "a time to weep, and a time to laugh; a time to mourn, and a time to dance." And these "times" are mostly of our own making.

Current Comment.

MALARIAL THERAPY.

SINCE Wagner von Jauregg introduced artificially produced malaria in the treatment of neurosyphilis, many disadvantages and even dangers have been observed from its employment. On the assumption that the benefit following this form of therapy was due solely to the pyrexia induced, other forms of pyrotherapy have been suggested in its stead. For instance tuberculin and various vaccines, such as streptococcal, staphylococcal, typhoid and others. The living organisms of other spirochætal diseases, such as relapsing fever and rat-bite fever, have also been used as well as non-specific proteins (milk) and chemical compounds, for instance sodium nucleinate and phlogetan (a nucleo-protein). Hetol (sodium cinnamate) has been tried in the hope that the induced leucocytosis might destroy the syphilitic organism by phagocytosis. Finally, pyrexia has been induced by diathermy; but this method introduces hazards of its own, such as those due to short-circuiting and the production of troublesome burns. A definite antisyphilitic action of the malarial organism has not been established, but the value of this method of treatment in some forms of syphilis of the central nervous system has been conclusively shown. Permanent remission of symptoms in cases of general paralysis may follow this method, even when the patient's serology is little or not at all altered. The latest series of Robert Lees showed that of fifty patients fourteen showed complete remission of mental symptoms after malarial therapy. Seven of these fourteen failed to react to the Wassermann test applied to the cerebro-spinal fluid; the blood serum of five failed to react, and both blood serum and cerebro-spinal fluid of two. In no case did the cerebro-spinal fluid fail to react while the blood serum continued to give a positive response.

C. C. Dennie, H. M. Gilkey and S. F. Pakula state that if malaria be beneficial in this form of syphilis its benefits should not be confined to paresis alone.[1] Other workers have demonstrated that the favourable effects of malarial therapy are due to stimulation of the reticulo-endothelial system. The endothelial lining of the blood vessels, the wandering lymphocytic cells in the perivascular spaces and the stellate Kupffer cells are increased in number and size. They become phagocytic and ingest the malarial organism and, presumably, the syphilitic treponema as well. W. L. Breutsch is of opinion that these phagocytes become very voracious when the temperature is elevated, but not at normal temperatures, the temperature being merely an activating factor. The actual destruction of the treponema

[1] *The American Journal of Syphilis*, July, 1931.

is accomplished by phagocytosis exerted by macrophages, plasmocytes and stellate Kupffer cells. The reaction of the reticulo-endothelial system to the malarial plasmodia may be so great that the blood vessels are denuded of their lining and hæmorrhages occur in the brain and internal organs. Malarial death may occur from acute yellow atrophy of the liver, due to the packing of these cells between the liver lobules or even between the hepatic cells in such numbers that the liver cells cease to function. Such manifestations may be seen also in the spleen. More people die from therapeutic than from spontaneous malaria.

Syphilis stimulates the reticulo-endothelial system. Plasmocytes and lymphocytes exist in recent and old syphilitic processes. Plasma cells may be seen in areas attacked years previously by syphilis. Syphilis is a disease of the blood vessels. A thick vessel wall and perivascular lymphocytic collar are seen at every stage of syphilis. If malarial therapy be used on an old syphilitic patient, such person has already a thickened and diseased vascular system, and an active process is employed, so intense that the vessel, already diseased, may rupture. Many believe that pyrexia, possibly by its action on cell lipoids, is the reason for the benefit resulting from malarial therapy, and many go further in their belief that any form of pyrotherapy which will raise the temperature from two to five degrees Fahrenheit, will be beneficial. Dennie and his colleagues are emphatically opposed to such views. Breutsch considered that elevated temperature increased the activity of the macrophages (cast off from the endothelial lining of the blood vessels as independent cells); but such macrophages must be present to obtain the best results from pyrexial treatment. Dennie and his colleagues found that elevated temperature was not essential for good results from malarial therapy. One patient preserved a normal temperature and in another it did not rise above 37·2° C. (99° F.). The assumption that pyrotherapy attained by such methods as diathermy will be as productive of good as malarial therapy is not tenable. Some benefit may result, since the macrophages, plasma cells and lymphocytes present owing to the syphilitic process would take on enhanced activity, but they would not be present in sufficient numbers to secure the most favourable results. The method of pyrotherapy employed must produce enormous numbers of these phagocytes. Dennie and his collaborators do not believe that mere physical measures will insure such results. Their contention is that macrophages must be present, but that pyrexia is not essential. Diathermy is not adequate unless the patient be also given some foreign protein, such as typhoid bacilli.

To prove that malarial therapy has a definite antisyphilitic value, the disappearance of hyperplastic syphilitic tissue must be demonstrable. Granting that malarial therapy is beneficial in syphilitic paresis, it should exert the same favourable effect upon syphilis of bone, skin, eye and the vascular system. The purpose of Dennie and his associates was to prove that malarial therapy in the human subject had a definite antisyphilitic effect wherever the luetic process was situated. Two classes of patients were taken—those whose treatment had been unsuccessful, and those who had received no treatment. They report four cases of interstitial keratitis, two of hyperplastic bone disease with joint implication and a malignant nodulo-ulcerative skin lesion. Interstitial keratitis has always been rebellious to any form of treatment, but all four of the cases quoted responded with remarkable rapidity to malarial therapy. The cornea rapidly cleared and improvement was maintained without further treatment. The circumciliary injection and photophobia disappeared before the clearing of the cornea. Dennie and his collaborators state that in old cases of chronic interstitial keratitis, when connective tissue is present in the cornea, no benefit would accrue from malaria. They give their explanation of the processes involved in interstitial keratitis and how benefit results from malarial therapy. Macrophages in their opinion are formed and aggravated by the action of the malarial plasmodium, and they probably enter the lymph spaces and ingest any remaining treponemata, cell detritus and toxins. In hyperplastic bone syphilis malarial therapy seemed efficacious; in the two cases the superimposed bone rapidly disappeared. As regards the periarticular infiltration about the knee joint, the hyperplastic tissue disappeared with restoration of function. In the resistant case of skin disease, when all other treatment failed, remarkable recovery was rapidly attained. In two other cases, however, of resistant skin syphilis the lesions disappeared with malarial therapy, but a slow recurrence subsequently occurred.

The aim of Dennie and his associates was to show that the malarial plasmodium itself or by secondary action is antagonistic to the *Treponema pallidum* or to the reactions engendered by it, and that the malarial organism effects the disappearance of hyperplastic or destructive syphilitic lesions. They do not urge its use as better than that of arsenobenzol, mercury, bismuth or the iodides. Malaria in their opinion does not effect clinical cure in syphilis, but raises the natural immunity forces of the body against that disease. The subsequent response to antisyphilitic remedies is better than before the malarial treatment. They urge that all patients with resistant syphilis, whether somatic or of the central nervous system, after malarial therapy, be given the customary antisyphilitic remedies. The cases quoted are too few to warrant an authoritative opinion. Work such as this will need to be confirmed before malarial treatment is widely adopted. The idea of curing one disease by giving the patient another is naturally abhorrent to medical practitioners. The practice is shown to be valuable in syphilis of the central nervous system. Before it is extended accurate information is required. There is always an unfortunate tendency to be over-eager in the acceptance of new suggestions.

Abstracts from Current Medical Literature.

SURGERY.

Torsion of the Testicle.

JOSEPH C. BIRDSALL (*Pennsylvania Medical Journal*, December, 1930) reports four cases of torsion of the testicle. This condition has formerly been regarded as exceptionally rare, and the author thinks that it does not receive adequate attention in the differential diagnosis of strangulated hernia. It is dependent upon an axial rotation of the cord which occludes the veins but not the arteries. According to Young it may be of two varieties. In the first the whole testis, including the tunic and epididymis, rotates within the scrotum; in the second variety it rotates intravaginally. The incidence of torsion is probably much higher in cryptorchids. The condition was first described in 1840. The chief cause was thought to be trauma *plus* maldevelopment. It may occur at any age. The onset is usually sudden and is associated with severe swelling and local pain. If torsion occurs on the right side, it may simulate appendicitis, but in all cases the differential diagnosis must include acute epididymo-orchitis and strangulated hernia. If it is untreated, hæmorrhagic infarction and necrosis may occur. The treatment is orchidectomy.

Treatment of Chronic Wounds.

H. EPPINGER (*Klinische Wochenschrift*, April 11, 1931) discusses the treatment of slow healing ulcers and wounds, and considers that in many cases they are manifestations of a local myxœdema. While some are associated with generalized hypothyreoidism and are influenced by the administration of thyreoid extract, in many instances this is unsuccessful. In such cases he believes that the hormone is prevented from reaching the wound surfaces by the indurated tissues surrounding them. Accordingly he has investigated the use of local external applications of thyreoid extract, either as an ointment or powder combined with foments. The results have been most satisfactory. The first sign of improvement is a profuse whitish discharge. The callous edges become freshened, new granulation tissue appears in the base of the wound and epithelial cells commence to grow in from the edges. Complete healing results in from one to two weeks after a long resistance to other methods of treatment.

Omental Tumours.

E. SCHLEYER (*Wiener Medizinische Wochenschrift*, April 4, 1931) discusses the origin of solid and cystic tumours of the omentum. Cystic tumours are usually chylous or echinococcal in nature, while innocent solid ones are fibromata and lipomata. Sarcoma and carcinoma have been noted, also dermoid cysts. Examples of pseudo-tumours are noted following extensive ligation of the omentum with inflammatory changes due to intestinal infection. He describes a case with a history of menorrhagia and abdominal pain in which at operation a hard tumour of the omentum was discovered adherent to a myomatous uterus. Examination of the growth proved it to be a myoma. The origin was considered to be uterine—an example of torsion with spontaneous amputation of a subserous uterine fibroid. Similar growths may arise from the stomach.

Intrathecal Injection of Carbolic Acid in Tetanus.

S. SUVANSA (*The Lancet*, May 16, 1931) has treated fourteen patients suffering from tetanus by intrathecal injection of a one in 400 solution of carbolic acid. This solution is the strongest which will not cause cellular damage, and is prepared by adding 400 cubic centimetres of physiological saline solution to one cubic centimetre of liquefied carbolic acid. It has a specific gravity of 1·006, equal to that of the cerebro-spinal fluid. Ten of fourteen patients recovered, although in every one the condition was severe. Among those who recovered was an infant, aged eight days, suffering from *tetanus neonatorum*. Of the four who died, two were regarded as hopeless from the start of treatment, the third had pyonephrosis and the fourth gangrene of the leg. The amount of fluid injected, after the withdrawal of an equal amount of cerebro-spinal fluid, varied from three cubic centimetres given to the infant to 40 cubic centimetres given to one adult. In three instances in which doses of 15 cubic centimetres or less had been administered, the injection was repeated. Three sequelæ were observed: (i) a rash, varying in character and intensity, and considered due to excretion through the skin; (ii) acute nephritis, no doubt due to elimination through the kidneys; (iii) rigidity of the back muscles due to irritation of the motor nerve roots. The advantages claimed for carbolic over serum are: (i) It is more certain in action, (ii) one injection suffices, (iii) the cost is almost nil. The one disadvantage is the danger in chronic kidney disease.

Malignant Tumours of the Kidney in Childhood.

FREDERICK LIEBERTHAL (*Surgery, Gynecology and Obstetrics*, July, 1931) writes about malignant tumours of the kidney in childhood. Most large abdominal tumours in childhood are malignant tumours of the kidney. Most malignant tumours of the kidney in childhood are mixed tumours of the embryonal adeno-sarcoma group. An extensive histological study of every case of renal tumour in childhood is urged. Sections should be taken from every part of the neoplasm and a careful search made for the typical epithelial groups which will identify the tumour as an embryonal adeno-sarcoma. The failure to demonstrate these epithelial groups does not exclude the possibility that the tumour belongs in this group. The embryonal adeno-sarcomata arise from the metanephros. The neoplastic change of the latter may occur at any stage in its development from the mesodermal stage, where it is present only as metanephric *Anlage*, to the point where actual metanephros has already differentiated. The earlier origin may be ascribed to those cases in which striated muscle is present, and the later origin to those in which it is absent. The glomerulus-like structures in these tumours represent true embryonic glomeruli. The most outstanding symptom of malignant renal tumours in childhood is usually a rapidly growing, painless abdominal tumour. Hæmaturia is usually absent. The mid-line laparotomy incision is preferred. Cystoscopic study of every case is urged to assure the presence of a functionally efficient kidney on the other side. In very young male children intravenous pyelography may suffice.

Post-Operative Respiratory Complications.

H. L. FOSS AND J. H. KUPP (*Surgery, Gynecology and Obstetrics*, December, 1930) analyse the respiratory complications occurring in approximately 3,500 operations in the three-year period ending December, 1929. From a short *résumé* of the literature they note that whilst the incidence of pulmonary complications has greatly increased, namely, from 0·38% in 1898 to approximately 3·92% in 1922, there has been a great decrease in mortality from these complications. Probably this has been due to more careful examination and better post-operative treatment. The authors believe that whilst aspiration of septic material may undoubtedly result in pneumonia and massive collapse, there is increasing evidence that post-operative embolism is a frequent condition preceding pulmonary diseases. In their series sixty patients (1·7%) developed pulmonary complication, and of these twenty-five (0·72%) died. Of the entire group three patients developed a frank lobar pneumonia; of these one died. The average day of onset was the fifth following operation. There were sixteen cases of bronchopneumonia and ten of the patients died. All had a general anæsthetic excepting one. Of the ten who died, seven left the theatre in good condition; all patients took the anæsthetic well. The average day of onset was the seventh following operation. Eleven patients developed bronchitis; of these seven had ether administered. Some of this group had previously suffered from bronchitis. Under the heading of infarction the authors include patients who suffered from a sudden sharp pain in the chest preceded by a rise in the temperature, a rise in the respiratory rate, and a definite rise in the pulse rate. There were fifteen in their

series. The majority of their patients were above fifty years of age; the duration of symptoms was four days, and the average day of onset was the seventeenth following operation. Three of the patients developed a coincidental phlebitis. The liability to embolism is definitely greater in patients over fifty years of age. Thirteen patients developed this condition and all succumbed within two hours following the onset of symptoms. Symptoms may develop between the first and forty-first days after operation. The authors think that massive collapse frequently passes undiagnosed. They record only two cases, but feel that some have been overlooked or were incorrectly listed. They base their diagnosis on the restriction of respiratory movement on the affected side and displacement of the cardiac impulse towards that side. The dome of the diaphragm was elevated and immobile on the homolateral side. One case followed a herniorrhaphy under local infiltration anæsthesia. Since November, 1928, spinal anæsthesia has been employed for all operations below the diaphragm. In these there was an incidence of pulmonary complications in 1·7% of the first 400 operations; this is approximately the same as the incidence following general inhalation anæsthesia. There is a much greater likelihood of pulmonary complications occurring in the winter months. The authors carry out the following routine: (i) Hyperventilation during and after operation with carbon dioxide and oxygen, (ii) changing the position of the patient every six hours, (iii) curtailment of sedatives after operation, especially those which depress the cough reflex or tend to produce pulmonary atelectasis.

Radium Treatment of Mammary Carcinoma.

MAX CUTLER (*Surgery, Gynecology and Obstetrics*, July, 1931) writes about the treatment of mammary carcinoma by means of removable radium needles. Because of the radio-resistance of mammary carcinoma, interstitial radiation constitutes the method of choice in the treatment of inoperable carcinoma of the breast. Long radium needles that are removable, permit a more uniform radiation than can be accomplished by radon seeds. Adequate filtration (0·5 millimetre of platinum) is essential in order to effect complete regression of tumours without necrosis. The irradiation of mammary carcinoma must follow the same principle as the radical operation for this disease, that is, the entire mammary gland and lymphatic areas must be regarded as invaded regardless of the extent of the disease as previously determined by clinical examination. The peripheral or growing edge of a tumour is the most dangerous part of the lesion and requires the most intense radiation. The central portion is poorly nourished, tends to bring about spontaneous necrosis and requires relatively little radiation. Healing of ulcerated lesions of the breast can be accomplished and impending ulceration prevented by the technique of radiation that has been presented. No claim can be made, however, for the permanency of the results. Peripheral radiation by means of long removable radon needles can accomplish regression of advanced mammary carcinoma which fails to respond to other methods of radiation therapy.

Sterile Catgut.

J. v. KREININGER GUGGENBERGER (*Münchener Medizinische Wochenschrift*, May 22, 1931) discusses at length the question of sterility of catgut as a ligature material. The transition of surgery from antisepsis to asepsis has left two factors, the hands of the surgeon and the catgut, which still require antiseptic measures to insure their sterilization. Rubber gloves can replace antisepsis as far as the hands are concerned, but the problem of the catgut remains. It is now recognized that no means can insure absolute sterility of the hands. They simply diminish the number of bacteria. It is the same with catgut. There is no disinfectant known at present capable of wholly destroying the spores contained in catgut. Clinically surgeons have endeavoured to explain those occasional cases of wound infection under apparently perfect aseptic conditions, by bacterial contamination from the air. This is no longer a valid reason. More likely is the actual implantation in the wound of spore-containing suture material. The mode of infection suggested by the author is as follows. The organisms in the catgut stump are held in check by the antiseptic material used in storing catgut for a few days. This antiseptic is absorbed and the organisms, now freed, are capable of multiplication and invasion. This does not occur in every case because of the individual capacity of the patient for resisting infection. The absence of infection in the vast majority of operations, then, cannot be held as proof of the sterility of the catgut. Whether a wound infection is to result or not depends on various factors which constitute the degree of resistance of the tissues, namely, constitution, state of the circulatory system, particularly with regard to the vasomotor question, length of the period of anæsthesia, the mass of buried suture material and many others—all these apart from the fact that it is not known when sterile and when unsterile suture material has been used. An uncomplicated operation, for example, for myomata, in older women produces more often an infected wound than the same operation in the young woman. E. Fränkel pointed out that the infection by a gas-producing organism can be observed in the uterus just as well as in the extremities of the body. Such an infection of the uterus has been attributed to organisms in the skin or in the dressings. This, however, is not so, because a "gas" infection sets in very early, and the observed uterine infection does not occur until the eighth day. The "*causa peccans*" is the catgut, and the delay in onset of the infection follows on the reason given earlier in the article. Experimentally the "gas"-producing bacteria require a special nidus in the form of necrotic tissue. This is provided by the presence of the ligature stump. It has been shown that sterile catgut under normal conditions can remain sterile in the peritoneum, that infected catgut can contain bacilli up to the seventh day at least. Given a suitable medium in the form of damaged tissues, the organisms are capable of multiplying.

Ætiology and Treatment of Thrombosis.

O. BUTZENGEIGER (*Deutsche Medizinische Wochenschrift*, April 24, 1931) discusses the various reasons advanced for the greater incidence of thrombosis noted in all countries, especially since the war. He considers that there is a close relationship between this and the epidemics of influenza which have occurred since 1918. Influenza causes alterations both in the vessel walls and the blood count, conditions which, when associated with infection, are liable to result in thrombosis. As regards treatment, he has tried the application of leeches in twenty-two cases. On six occasions remarkable success followed their application in cases of thrombosis of the pelvic veins. The earlier they are applied, the better. This necessitates accurate observation of the early symptoms, such as cotton wool feeling in the soles of the feet, irritation about the anus and pain in hæmorrhoids. He applies a couple of leeches in the region of the thrombosis parallel to the vein involved and allows them to suck until they fall off. This is repeated for two to three days. Except in mild cases and those in which rapid resolution of the clot occurs, it is best to keep the patient in bed for three weeks.

Fascial Strips in Fracture of the Patella.

PEIRCE H. LEAVITT (*New England Journal of Medicine*, October 9, 1930) reports success from the use of the fascial strips in fractures of the patella. Apparently Seubert was the first to employ this method in 1915. He used strips of fascia approximately the same width as the patella and attached it to the quadriceps tendon for a distance of 3·75 centimetres (one and a half inches) proximal to the patella and also to the patellar tendon for a similar distance. He used fine plain catgut as his suture material. The author thinks this method has an advantage over inserting the fascial strip into the two tendons. He also employed this method in fractures of the olecranon. He now treats all fractures of the patella by this method, and claims as its chief advantage that function is restored much earlier than by any other method.

Special Abstract.

NUTRITIONAL ANÆMIA IN INFANCY.

SIMPLE anæmia of infancy has been the source of a good deal of controversy. Divers views are held concerning its ætiology, its nature, its incidence and its treatment. Of its importance there can be little doubt. In a recent report Dr. Helen M. M. Mackay reviews the rather extensive literature and publishes the results of her work on the subject.[1] Dr. Mackay was assisted in the investigations by Miss Lorel Goodfellow. Altogether 1,090 infants and 168 expectant and nursing mothers were examined.

HISTORY.

The report opens with a summary of the literature concerning anæmia of infants. In 1889 Bunge showed that the proportion of each metal, with the exception of iron, in the ash of the dog's milk, was almost identical with that in the ash of the puppy; the quantity of iron in the ash of the puppy was six times that in the ash of the mother's milk. In 1892 he showed that the proportion of iron in the body of the young animal was highest at birth, and that it decreased progressively until the animal commenced to take a mixed diet. That is to say, the animal draws its necessary iron from the storehouse of its liver until it is able to forage for itself. On the other hand, Bunge observed that the young guinea-pig's liver was not provided with a great quantity of iron; this animal commences to eat on its first day of life, and is thus able to obtain sufficient iron from its food. In 1899 Hugounenq observed that two-thirds of the iron content of the human fœtus was laid down during the last three months of intrauterine life; thus the premature infant should be poorly equipped with iron in comparison with a full term infant; it is found, however, that the proportion of iron per kilogram of body weight is not much less in the premature infant. Later investigators have shown that anæmia may be produced in young animals if the period of milk feeding is sufficiently prolonged, and that the rate of the animal's growth varies inversely as the degree of anæmia.

It was found by German workers that infants fed on cow's milk or goat's milk retained only about one-fifth the quantity of iron absorbed by infants taking human milk.

In 1912 Czerny advanced the theory that anæmia of infancy had its origin in an alimentary disturbance. He discarded the iron-deficiency theory and suggested that the affected infants had a "constitutional anomaly" and that the injurious factor was cow's milk fat, which caused the stools to become soapy and robbed the body of bases; anæmia was due to the resulting acidosis. For treatment he recommended the reduction of milk in the diet to a minimum and the administration of a mixed diet. Kleinschmidt, in 1916, agreed with Czerny in the main, and expressed the opinion that infants affected with anæmia came from defective stock; he regarded iron as valueless in treatment.

Several workers showed that the hæmoglobin content of premature infants dropped very rapidly during the second, third and fourth months of life. Landé noted that the hæmoglobin percentage of infants born during the seventh month of pregnancy fell to a lower level between the fourth and sixth months of extrauterine life than did that of infants born during the eighth month of pregnancy. She regarded this as evidence that anæmia was due to iron deficiency, and pointed out that the administration of iron caused a rise in the hæmoglobin percentage at a time when it was usually falling.

Two important facts emerge as the result of work on anæmia of infancy that has been carried out during the past decade: it has been shown that vitamin deficiency plays no part in the causation of this anæmia; American investigators found that the administration of a pure iron salt is ineffective in the treatment of milk anæmia of rats and that a small amount of copper is necessary. This may be one of the reasons why such widely variable results have been obtained in the treatment of infantile anæmia by means of iron.

VIEWS CONCERNING THE NORMAL HÆMOGLOBIN LEVEL.

All authorities are agreed that the hæmoglobin percentage is highest in a newly born child and that it decreases during the succeeding months of the infant's life; but there is no agreement as to the normal figures. Dr. Mackay suggests that this disagreement is partly due to the technique employed in taking the blood. For example, blood obtained from the ear contains a far higher percentage of hæmoglobin than blood from the heel. Drucker suggests that this difference is due to changes in tone of the capillaries and arterioles, and remarks that these factors can be practically eliminated if an extremely sharp knife is used and blood is taken from the ear. Another cause of contradictory results is the difference in colorimetric standards employed in the estimation of hæmoglobin. It is well known that some of these fade. Other sources of confusion are that in some instances infants have been examined who could not fairly be classed as normal; opinions have been founded on the results of the examination of too small a number of infants; and in many instances no consideration was given to the ages of the infants examined.

NUTRITIONAL ANÆMIA OF ARTIFICIALLY FED INFANTS.

Her investigations in 1925, 1926 and 1927 led Dr. Mackay to conclude that anæmia of artificially fed infants was common, that ultra-violet light had no prophylactic value, and that the administration of an iron salt was of value in prophylaxis and treatment. The infants who received iron medication not only had a healthier appearance than those of the control group, but they also appeared to be much less liable to sickness. However, the two groups were investigated at different periods. In 1928 and 1929 174 infants attending the out-patients' department of the Queen's Hospital for Children were divided into two groups as evenly matched as possible with regard to age, weight and general condition. The same treatment and general methods of management were advised for them all, save that the infants of one group were given iron, the others not. The infants came of poor families for the most part; but the very poorest were not included in the investigation, for they were usually advised to apply for a milk grant from the public health authorities instead of buying milk at the hospital. Most of the infants were between one and five months old when first included in the series. Most of them were subnormal in weight; usually, when first brought to hospital, they were suffering from the effects of improper feeding (generally underfeeding); some were affected with minor maladies; some few were convalescent from a serious illness.

Method of Feeding.

Each infant was fed, chiefly or wholly, by artificial means. The milk used was "Cow and Gate"—a full cream, roller-process, dried milk. Cane sugar, cod liver oil and orange juice were also administered. When the infants reached the age of eight months, a mixed diet was given. More than half the total calories provided were then contained in foods other than milk; thus considerably more iron was taken than is usually present in the food of infants aged eight months and more.

Iron Medication.

Iron was given in the form of iron and ammonium citrate, which, it was found, contained traces of copper and manganese. The iron salt was added to the milk by the manufacturers before the drying process was commenced. The milk powder—known as "Hemolac"—then contained 4·6 grammes of iron per kilogram (31½ grains to the pound). A mixture containing iron and ammonium

[1] "Nutritional Anæmia in Infancy, with Special Reference to Iron Deficiency," by Helen M. M. Mackay, assisted by Lorel Goodfellow, with a Statistical Appendix by A. Bradford Hill; Medical Research Council of the Privy Council, Special Report Series, No. 157.

citrate was sometimes prescribed in addition. The infants receiving the iron were no more liable to constipation than were the others.

Effects on Hæmoglobin Content.

In the control series the hæmoglobin percentage of all infants aged two months and upwards, excepting those aged five to six months, was less than seventy. The hæmoglobin percentage of the controls was lowest in the second and third months of life; it then rose until the sixth month was reached, when it gradually fell away, until, in the twelfth month, it dropped to sixty-five. The hæmoglobin percentage of infants receiving iron treatment did not fall to such a low level during the second and third months; it rose more rapidly, and in the sixth month was over 75; there was very little variation from this figure during the following months. It should be noted also that these figures are not an average for the hæmoglobin percentage of infants treated from birth, as many were not seen until they were two months old, when their hæmoglobin percentages were already very low. In a selected group the original hæmoglobin percentage, before the administration of iron, was discounted, and only those infants were considered who were beyond doubt receiving adequate doses of iron. It was found that the hæmoglobin percentage of three-months-old infants in this group was over seventy; infants aged six months had a hæmoglobin percentage of 77; and this figure remained constant, with but slight variations, until the twelfth month was reached, when there was a rise to about eighty.

A very striking feature was the freedom from illness of the infants receiving iron treatment, as compared with controls of corresponding ages. The average weight of infants receiving iron treatment was higher by 0·3 kilogram (three-quarters of a pound) at the age of four to six months than that of the controls, by 0·45 kilogram (one pound) at seven months, and by 0·56 kilogram (one and a quarter pounds) at eight to eleven months.

The Hæmoglobin Content of Breast-Fed Infants.

Dr. Mackay investigated 230 breast-fed infants in the out-patients' department of the Mothers' Hospital. All were in good general health, and their average rate of growth was good. The average hæmoglobin percentage was only slightly higher than that of untreated artificially fed infants and considerably lower than that of artificially fed infants receiving iron treatment; the difference was greatest at about the twelfth month of life. It is concluded that similar factors influenced the hæmoglobin content of artificially fed and breast-fed infants. Examination of the blood of fifty nursing mothers revealed that more than half had a hæmoglobin percentage of less than eighty.

Treatment of the Mother.

Part VI of the report (by Edith M. Hall, Helen M. M. Mackay and Lorel Goodfellow) is devoted to a consideration of the effect on the mother of iron medication given before and after confinement.

Iron was administered in the form of iron and ammonium citrate pills. The results of recent work appear to indicate that the doses given were too small; the observers also mention that in some instances the iron was taken irregularly. Forty-four women were treated, and thirty-nine were used as controls. Before parturition there was a similar slight increase in the hæmoglobin content of the women in both groups. It was noted that the hæmoglobin percentage of women receiving iron after parturition increased to a greater extent that that of the control women. Anæmic women tended to recover after parturition, whether given iron or not, but the administration of iron hastened recovery.

The infants of the women in these groups were breast-fed. There was no evidence that the administration of iron to the mother had any effect on the infant's hæmoglobin content, on its weight, or on its liability to infectious disease. The authors suggest, however, that the administration of ante-natal treatment over a longer period than one and a half months (the average length of treatment) might have a favourable influence on the infant.

Factors Influencing the Infant's Hæmoglobin Content.

Maternal Factors.

An investigation was conducted with the object of discovering what ante-natal maternal factors influenced the infant's hæmoglobin content. Evidence was inconclusive; but Dr. Mackay thinks it probable that anæmic and physically immature mothers are more likely to give birth to anæmic children. The number of previous pregnancies did not seem to be a factor. There was no evidence that anæmia of infants had anything to do with food deficiency of the mother; though Dr. Mackay expresses the opinion that insufficiency of iron in the diet of the pregnant woman would be likely to cause anæmia of the infant. It is worthy of note that some infants became anæmic despite the fact that their mothers were provided with a diet which should have contained an ample supply of iron. A few women suffering from mild toxæmia of pregnancy gave birth to infants whose hæmoglobin content was not below the average.

Infantile Factors.

Dr. Mackay finds that the weight of the infant at birth and the rate of growth have an important influence on the hæmoglobin percentage. A premature infant, or an infant that is very small at birth, grows at a much greater rate, if its progress is satisfactory, than a normal or large infant. An infant that grows rapidly is more liable to anæmia than a slowly growing infant, for it more rapidly consumes its store of iron. The influence of the rate of growth does not become apparent until the infant has reached an age of six months or so, that is, when the period of feeding by milk alone has come to an end. Dr. Mackay also finds that the hæmoglobin percentage of an infant that has a low weight at birth, drops to a greater extent during the early months than does the hæmoglobin percentage of an infant of normal weight, irrespective of the rate of growth. Thus the weight at birth has an important bearing, directly and indirectly, on the production of anæmia.

Mild infectious disorders, such as coryza, mild enteritis, or a localized inflammation, do not seem to have any effect on the hæmoglobin content, but severe illness tends to deplete the iron store and hasten the onset of iron deficiency. Iron should always be administered after severe illness. Babies who suffer from jaundice, whatever its cause, are likely to suffer from iron deficiency.

Infants fed on human milk are less likely to become anæmic than are artificially fed infants. "The duration of the anæmia is determined by the duration of a diet deficient in iron."

The Normal and Average Hæmoglobin Content.

An investigation was made with the object of discovering the normal and average hæmoglobin percentages in the blood of infants at various ages. Dr. Mackay makes no claim that the figures obtained by her are the true ones, but she suggests that the normal hæmoglobin percentage in the third or fourth week of life is 99; at the end of two or three months it is 69; after this age there is a gradual rise, until at the end of the fifth or sixth month the percentage is 80; this figure is constant during the remainder of the first year of life.

The average hæmoglobin percentage differs from the normal. There is a sharp fall to below 70 during the first two or three months of life; there is then a rise that reaches its maximum of about 5% by the time the child is five or six months old; there is then a gradual fall during the remainder of the first year of life to about the level reached during the first two or three months.

The Prevalence of Anæmia in Infancy.

If a drop of ten *per centum* below the suggested normal standard is taken to indicate anæmia, then, according to

Dr. Mackay, 45% of breast-fed infants and 51% of artificially fed infants less than twelve months old are anæmic. At the age of twelve to thirteen months the figures are 42% and 70% respectively. In many instances the anæmia is of a mild degree, but, among the infants observed, it caused a greatly increased morbidity rate. Premature infants and twins almost invariably become affected with anæmia.

THE PRESENT KNOWLEDGE OF ANÆMIA OF INFANCY.

The report concludes with a summary of the existing knowledge concerning "nutritional anæmia of infancy." The condition is defined as "a type of anæmia prevalent among infants, due to a deficiency of available iron and possibly also of copper . . . ."

Pathology.

The characteristic pathological feature of nutritional anæmia of infancy is a reduction in the hæmoglobin content of the blood. The anæmia is of the chlorotic type. The number of the white blood cells and the relative numerical proportions of the various types of white cells are probably unaffected, unless the condition is complicated by an infection. Enlargement of the spleen or lymphatic glands does not occur.

Symptoms and Course.

The onset is insidious. Pallor is often pronounced before the mother notices that anything is wrong. The illness affecting a breast-fed baby generally commences when the infant is between four and seven months old; artificially fed infants generally become affected at an earlier age. The colour of the lips is the most reliable clinical guide; but it must not be solely relied on for purposes of diagnosis: an estimation should be made of the hæmoglobin percentage. Icterus does not occur in uncomplicated cases.

Some authorities are of the opinion that the disease is self-limited. This erroneous view is evdently founded on the observation that a rise in the hæmoglobin percentage occurs when the infant is five or six months old. If observations are continued for a further period, it becomes obvious that the hæmoglobin content is not maintained at the comparatively high level reached during the sixth month.

Other features of the symptoms and course have already been dealt with.

Treatment.

Prophylaxis.

There is no evidence that anæmia of infancy can be prevented by treating the mother before her confinement. Nevertheless, Dr. Mackay remarks, since anæmia of the mother appears to predispose the infant to anæmia, the treatment of anæmic expectant mothers is indicated.

The infant should commence to receive prophylactic treatment before it is two months old. After the weaning the milk supply should not be so plentiful that the infant will desire no other food.

Therapeusis.

Curative treatment should be similar to prophylactic treatment. The doses of iron should be small at first and gradually increased. Iron should be administered whenever an anæmic condition results from an infection. It should be borne in mind that prolonged milk feeding causes iron deficiency. The effect of increasing the dosage of copper is not known.

Dr. Mackay remarks that the dietetic treatment of Czerny and Kleinschmidt, appears to effect a cure in a similar period to that required by iron medication; but she utters a warning against the sudden change in diet recommended by Kleinschmidt.

The administration of liver can result in a rapid increase in the hæmoglobin content, for liver contains both copper and iron. Liver extract alone was of little apparent value in one of the two cases in which Dr. Mackay tried it; but the extract contains practically no iron.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Sydney Hospital on July 9, 1931. The meeting took the form of a series of clinical demonstrations by the members of the honorary staff.

Carcinoma of the Tongue.

DR. H. S. STACY showed a man, aged seventy-two years, in whom a "blister" of the tongue became in two months a large ulcerated area. There was considerable surrounding induration of the tongue and the floor of the mouth. The patient was not able to protrude his tongue beyond the teeth and the tongue was deviated to the side of the lesion. He was in considerable pain and both deglutition and articulation were seriously affected. He had lost weight. His blood serum did not react to the Wassermann test. Ten one-milligramme needles were implanted and a dose of 2,026 milligramme-hours was given. Acute stomatitis followed and subsided. Three weeks later Dr. Stacy dissected out the superficial lymph bed of the neck. He pointed out that the wound had healed well. According to the reports of the histologists, there was no malignant infiltration of the glands. At the time of demonstration, ten weeks after the treatment, the patient looked well, could speak more clearly than before, had no difficulty in swallowing and could protrude his tongue 18·0 millimetres (three-quarters of an inch) beyond his teeth. The site of the lesion was much more pliable.

Tumour of the Lung.

Dr. Stacy also showed a healthy looking man of twenty-seven years of age, who complained of dragging pain in the left side of the chest and of dry cough for twelve months. In the last nine months he had lost 4·1 kilograms (nine pounds) in weight. There were no other symptoms. Dr. Stacy explained that ten years previously the patient had had three operations for empyema on the right side. He had come from England five years before and had lived at Forbes and Canowindra. He had drunk out of sheep dams and had worked at rock crushing. There was no venereal, tuberculous or other relevant history. At the time of admission examination revealed the clinical signs of a large solid tumour in the left lung posteriorly, extending from the fifth to the eighth rib. The radiologist reported the presence of a hydatid cyst of the lung. The Casoni test yielded no reaction. There was no reaction to the complement deviation test for *Tænia echinococcus*. Neither the Wassermann test nor the diagnostic tuberculin test yielded reactions. Paracentesis of the tumour drew nothing but blood. Thoracotomy was performed twice. The tumour was found to be solid and not cystic, and close to the visceral pleura, but specimens for histological examination could not be secured. The patient was given five applications of deep X ray therapy. He lost his symptoms and at the time of the meeting felt well and had gained weight. There was, however, no change in the X ray appearance of the tumour since the last application of deep therapy.

Fracture of the Humerus.

Dr. Stacy's third patient was a man, aged fifty-eight years, who had suffered from a comminuted fracture of the lower end of the right humerus. The shaft of the bone was broken about five centimetres (two inches) from the lower and, and the lower fragment was split longitudinally into the elbow joint. There was gross medial, posterior and upward displacement of the lower fragment. Great œdema of the soft tissues was present. First of all the arm was put up in extension under anæsthesia in a Thomas splint, but the displacement remained uncorrected. The next day the arm was manipulated under anæsthesia and put up in acute flexion. The deformity could not be corrected, and in addition acute angulation occurred. A fortnight later, when œdema had subsided, Dr. Stacy cut down on the fracture and plated

the lower fragment to the shaft. The arm was put up in flexion. The position was good, except for some separation of the lower medial fragment. The wound healed well, and callus formation was exuberant. Five weeks later massage and active movements were commenced. The patient practised movement assiduously, and at the time of the meeting, fifteen weeks after the injury, he was able to put his hand to his occiput. The range of movement was from 185° to 75°.

Myasthenia Gravis.

Dr. Wilfred Evans showed a male patient, aged forty-eight years, who was suffering from *myasthenia gravis*. The patient was a single man and a fisherman. The family history was irrelevant and there was no history of venereal disease. Twenty-two years ago the patient began to see double and still does so. The left eyelid began to droop and then the right. Movements of the eyeballs gradually became more restricted till the right became quite fixed two years ago and the left almost fixed. He said that during the last six months his feet felt as if they did not belong to him, and flopped about. All his muscles became weak and he could not walk a mile without resting frequently. Six months before the meeting he had great difficulty in chewing and swallowing, as the food used to "stick at the back of his nose." This improved, but after a few minutes the muscles became tired.

On examination speech was moderately good, but the patient could not talk loudly; his face was expressionless. Ptosis of the eyelids was almost complete on both sides. Both pupils reacted to light and accommodation. On the right side all eye movements were absent, and on the left the patient could look downwards but slightly. There was complete paralysis of the fourth cranial nerve on both sides. The sixth nerve was completely paralysed on the right and almost completely paralysed on the left side. The fifth nerve appeared to be intact. The patient could not smile at all. He could not put his mouth into the whistling position, the naso-labial folds were obliterated and the patient could scarcely wrinkle his forehead. The palate moved evenly and fairly well. Examination of the eleventh and twelfth nerves showed that fatigue was easily produced. There was weakness of all the muscles of the body, especially of the left arm; the patient became tired very easily. There was no loss of sensation. The abdominal reflexes were absent and the left supinator and biceps jerks were diminished.

Post-Encephalitic Parkinsonism.

Dr. Evans also showed an unmarried girl, aged twenty years. She suffered from measles at the age of two and from whooping cough at the age of ten. She came to hospital complaining of increasing weakness of the left arm and leg of five years' duration. Two years before admission the back began to get weak and she could not stand up straight. For three years the patient had found that on excitement the left hand trembled and that it was difficult for her to "get words out." On two occasions, one year and again two months before admission, the jerking movements of the left hand were accompanied by similar movements of the left side of the body and were followed by a period of unconsciousness lasting fifteen minutes. On examination the patient was rather anxious and nervous. The facial expression was normal. There was weakness of the left arm and of the flexors of the left foot. The gait was peculiar; the patient put her weight on the left foot, twisted her back and crept along in a furtive manner. Dr. Evans thought that this was a functional condition added to the post-encephalitic Parkinsonism. Sensation was intact. All the reflexes were hyperactive, especially the abdominal reflexes on the left side. The plantar reflex was flexor. There was a tremor of the left thumb and forefinger which was somewhat "pill-rolling" in character. The fundi were normal.

Acromegaly.

Dr. Evans's next patient was a labourer, aged thirty-five years, who had been complaining of headache and langour for four years. His eyesight was good. On examination he presented an appearance typical of acromegaly. In 1927 X ray examination revealed enlargement of the *sella turcica* with definite thickening of the cranial bones. In 1931 the radiologist reported that the calvarium was unusually thick and that the frontal sinuses were unusually prominent. The *sella turcica* was definitely enlarged. The patient's blood did not react to the Wassermann test.

The Facio-Scapulo-Humeral Type of Muscular Dystrophy.

Dr. Evans also showed a man, aged forty years, a farmer, who said that he was losing the use of his arms. The trouble started in the left arm and then in the right, and had been coming on for twenty years. He first noticed that in taking off his hat he had to bend his head. For the last two years he noticed that if either foot struck an uneven surface, he fell forward. He had some stiffness in the back, but no pain. He became very tired towards evening. On examination there was an atrophy of the trapezius muscles, the rhomboids, the *serratus anterior*, the *latissimus dorsi*, and the pectorals, especially the clavicular heads. The supraspinatus, the infraspinatus, the sterno-mastoid and the deltoid muscles were not affected. Wasting was pronounced in the biceps and triceps. The muscles of the forearm were fairly free from involvement. In the lower extremity the lower ends of both vasti muscles were affected, together with the muscles of the anterior aspect of both legs and the posterior muscles of the left leg. The abdominal muscles were intact. The knee jerks were sluggish. The Wassermann test yielded no reaction.

Disseminated Sclerosis.

Dr. Evans also showed a male patient, aged forty-eight years, a salesman, who was suffering from disseminated sclerosis. He gave a history of having suffered from gonorrhœa at the age of seventeen years, but gave no history of syphilis. He said that on waking one morning two years previously he fell out of bed—his arms and legs had lost their power and he had a feeling of "sand" in them. These symptoms improved during the last two years, with periods of remission and exacerbation. He also complained of formication of the skin of the chest and did not like warm water. He noticed at times an urgent desire to micturate which came on especially when he exerted himself. Sixteen months before the meeting the patient was treated with injections of "Salvarsan" without good result; and one year ago he was infected with malaria and allowed to have eleven rigors, which, he stated, had a good result.

On examination the patient was obese, his speech was good, he had an emotional tone and was optimistic. He had paresis of the left arm and leg and a typical spastic gait. His vibration sense was absent except over the fifth lumbar and first and second sacral segments on the left side and the fifth lumbar segment on the right. His sense of passive position was impaired in both feet. His sense of touch was unimpaired. His sense of pain was impaired on the left side in the fourth and fifth cervical segments and from the sixth thoracic to the fifth lumbar segment; it was impaired on the right side from the sixth to the twelfth thoracic segment. The plantar reflex was extensor in type on both sides. The abdominal reflexes were absent. The knee jerks, ankle jerks, the biceps, supinator and triceps jerks were increased on both sides. There was loss of control of the vesical sphincter on exertion and ankle clonus was present on both sides. The blood serum and the cerebro-spinal fluid both failed to react to the Wassermann test. Neither a test meal nor a blood count revealed any abnormality. Ophthalmoscopic examination revealed early bitemporal pallor of the optic discs. Dr. Evans said that the patient had had five weekly injections of typhoid, paratyphoid *A* and *B* vaccine and was showing some improvement in walking.

Tabes Dorsalis.

Dr. Evans's next patient was a married man, aged fifty-four years, who came on January 28, 1931, complaining of pain in the leg and ankles, but not in the knees, and of pain in the elbows and wrists. The pain was severe and momentary and had occurred intermittently for two years. It was worse in wet weather. There was a history of syphilis twenty years before. The patient's wife had

never been pregnant. In addition to the pain, the patient complained of numbness in the feet and of constipation. He was forgetful and had no notion of micturition unless he coughed or went to stool.

On examination the pupils reacted slightly to accommodation and not to light. There was left-sided ptosis of the eyelid. Knee jerks and ankle jerks were absent. Rombergism was present and the gait was tabetic. There was interference with the vibration sense in the lower limbs and butterfly anæsthesia was present over the nose. The Wassermann test yielded a completely positive reaction. No abnormality of the aorta was discovered on X ray examination. The urea concentration test yielded the following figures: 3·0, 3·2, 3·4, 3·6.

Dr. Evans said that the patient was given mercurial inunctions and potassium iodide from the time of admission until April 11, 1931. At this stage intravenous injections of "Novarsenobillon" were commenced; the patient received four injections and was then given five intramuscular injections of mercury. Treatment was then interrupted by an acute attack of jaundice. At the time of demonstration the patient still had some ataxia, but the lightning pains were less and he felt much improved.

Syringomyelia.

Dr. Evans also showed a single man, a flour miller, who came on November 27, 1929, with the history that six months previously he had a cough followed by epigastric pains. This pain spread up the left side of the chest to the left arm and then down to the fingers. Two months before admission he lost the use of the left fingers and began to squint, though he did not see double. He still had tingling in the left fingers and the right leg. He cut the left index finger severely, but was unaware of pain or injury until he saw the blood. Shortly afterwards he burned the left hand on a hot vessel, but felt no pain. He noted that the left side of his face did not sweat.

On examination there was left-sided ptosis, enophthalmos and myosis, and the left side of the face did not sweat—a left cervical sympathetic palsy. The left hand was wasted. The flexor muscles of the left forearm were also wasted. In the left hand and forearm there was diminution of sensibility to pin prick, heat and cold. In the right leg there was some diminution of temperature sense and vibration sense. The blood did not react to the Wassermann test. X ray examination revealed no abnormality in the left shoulder, no evidence of a cervical rib and no evidence of spinal neoplasm. The patient was treated with a mercury and iodide of potash mixture. At the time of the meeting thermal and pain anæsthesia was more definite. Wasting was progressive and contractures were developing. Dr. Evans said that the area of disease was so far apparently unaltered.

Multiple Fractures.

DR. GEORGE BELL showed a male patient, aged forty-four years, who had fallen fifteen feet on to the pavement. Angulation of the left femur was present just above the knee joint with a wound of the skin through which synovial fluid was escaping. The right foot was displaced medially and inverted. The right wrist was swollen and tender. X ray examination revealed a comminuted fracture of the lower third of the femur with perforation of the knee joint, subastragaloid dislocation of the right foot with fracture of the tibia and fibula, and fractures of the right scaphoid and radius. The wound of the knee was cleaned up under anæsthesia and the limb was put up in a Thomas splint. The right foot was put up in plaster. A splint was applied to the right wrist. Later on a Hodgen splint was applied with the knee bent and the thigh in abduction. The patient had an uninterrupted recovery.

Dr. Bell also showed a man, aged twenty-two years, who was admitted three days after a motor cycle accident. Examination revealed fractures of the right femur, the left femur, the navicular bone in the left wrist and the left tibia and fibula. Both femurs were put up on a Corlette splint with hooks and extension, and the other fractures were manipulated and fixed. Later on it was found necessary to perform open reduction of the fracture of the left femur and the fragments were fixed with phospho-bronze wire. The result was satisfactory.

Calcification in Subacromial Bursæ.

DR. G. C. WILLCOCKS showed a woman, aged thirty-nine years, who had complained of pains about the shoulder joint for eight months. The right shoulder was first affected; no definite signs were found, except limitation of movement and some tenderness on pressure beneath the acromion process. X ray examination revealed evidence of calcification in the subacromial bursa. Investigations of the teeth, tonsils and gastric secretion were made; four teeth were extracted, said to have septic roots; otherwise no abnormality was found. After three months the patient complained of pain in the left shoulder joint, and X ray examination showed a smaller area of calcification in the same situation.

Treatment as for arthritis was carried out at first, latterly parathyreoid extract was used, and pain was relieved. Dr. Willcocks said that he proposed to try the effect of "Radiostol" or parathyreoid hormone. The condition indicated deposition of calcium, whether due to hypercalcæmia or to local circulatory disturbances was not known. There were no obvious changes and no complaints about other joints, and the patient appeared particularly strong and healthy and certainly did not look thirty-nine years old. Her diet had not been unusual. Dr. Willcocks added that subacromial bursitis was frequently attributed to strain and over-use of the arms; this was by itself a most inadequate explanation. Gouty, gonorrhœal, syphilitic, and tuberculous forms of bursitis were described. The cause in this case was still uncertain.

Raynaud's Disease.

Dr. Willcocks also showed a young man who complained that his hands had been cold, blue and rather painful at times for two years. He had been well otherwise, and had had no previous illnesses of any significance. He had always been of a nervous disposition and was so still. His feet were similarly affected for some months. He noticed that the hands and feet had been worse during the winter months. On examination the hands were purple and cold; four weeks ago, when he was first seen by Dr. Willcocks, the feet and toes were similarly affected. As a rule the condition of the hands had been unaffected by rest in bed and warmth; they were cold and blue in all changes of temperature.

Dr. Willcocks said that the condition was usually regarded as a less degree of the condition which Raynaud described in 1862. It was a neuro-vascular disorder due to some unknown factor which involved the vasomotor nerves or their centres in the subthalamic region. In this case, as frequently happened, there was a neurotic tendency. The disorder was related to other vasomotor and trophic disorders, such as erythromelalgia, acroparæsthesia, acrocyanosis. Such a condition of cold, blue hands was not uncommon in many neurotic subjects, particularly the depressed melancholy type. This boy complained much of mental depression. It was interesting to speculate on the relationship of this malady to acrodynia, an epidemic of which occurred in Paris in 1827, and to pink disease (erythrœdema) of children. It was probable that all these conditions were due to affections of the sympathetic nervous system of varying intensity. Dr. Willcocks explained that the symptoms in this case were fairly severe four weeks ago. It was not a very rare condition; every winter several such patients attended the out-patient department. Dr. Willcocks had seen four cases during the last month, the other three patients being girls about twenty years of age. Many such patients recovered fairly completely when treated with dried thyreoid gland and on lines to build up the general health. In this case injections of acetylcholine 0·05 to 0·1 gramme had been given with some benefit.

(To be continued.)

NOMINATIONS AND ELECTIONS.

THE undermentioned has been nominated for election as a member of the New South Wales Branch of the British Medical Association:

Cramp, Cameron Oliver, M.B., B.S., 1930 (Univ. Sydney), 13, Birriga Road, Woollahra.

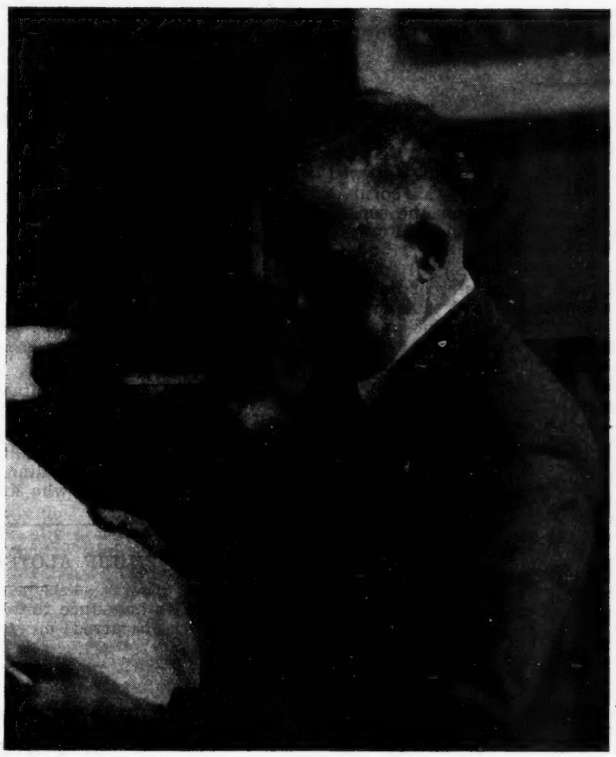
Obituary.

JAMES KYNASTON COUCH.

We are indebted to Dr. J. J. Holland for the following account of the career of the late Dr. James Kynaston Couch, whose death was recorded in a previous issue of this journal.

Dr. James Kynaston Couch was born in Swansea, Wales, on January 16, 1864. After leaving school he was apprenticed as a medical student to his father, Dr. James Couch, a well known practitioner of Swansea. Later he went to Middlesex Hospital, London, where he gained many prizes, including the Robert Wishart Lyell gold medal for proficiency in surgical anatomy and practical surgery.

He became a member of the Royal College of Surgeons of England and a licentiate of the Royal College of Physicians of London in 1888, and took the M.D. degree of Durham University in 1905.



He had joined his father in practice in Swansea, and during his residence in Swansea he was for fourteen years on the honorary staff of the Swansea Hospital and held the position of Honorary Assistant Surgeon until February, 1906, when he came to Perth, Western Australia, to enter into partnership with the late Dr. E. J. A. Haynes. After several years the partnership was dissolved and Couch practised on his own account.

He was one of the founders of the Swansea Medical Society and was secretary of that body. He was secretary of the Swansea Medical Practitioners' Association, which was the forerunner of the Swansea Division of the British Medical Association. At the 1903 annual meeting of the British Medical Association at Swansea he was secretary of the exhibition. Throughout his life he was interested in the betterment of the British Medical Association.

He held the position of Honorary Gynæcologist to the Perth Hospital until 1928, and later was appointed Honorary Consulting Gynæcologist. He was Honorary Obstetrician to the King Edward Memorial Hospital, which position he occupied at the time of his death.

During the war years he served in the Australian Imperial Force, retiring with the rank of major.

Always interested in the British Medical Association, he served for some years on the Council of the Western Australian Branch of the Association, and was President in 1917.

Dr. H. G. Tymms writes:

By the death of James Kynaston Couch, at the age of sixty-eight, at Perth, an old esteemed colleague has been removed from our midst, who will be greatly missed by all who were privileged to be associated with him in professional work. He was born in Wales and practised for many years with his father at Swansea. It was in 1906 that I made his acquaintance shortly after he came to practise in Perth.

He was then surgeon to the Children's Ward at the Perth Hospital. Later on he was appointed assistant gynæcologist, and on the death of Dr. A. J. Nyulasy he succeeded to the senior position and occupied it until he retired from the staff in 1928 and was appointed consulting gynæcologist to that institution.

In addition to gynæcological practice he had considerable experience in obstetric work, and when the King Edward Memorial Hospital was founded in Perth as a maternity hospital, he was appointed to the honorary staff, where he gave the patients the benefit of his skill ungrudgingly to the end.

For many years he took a great interest in Saint John Ambulance work and lectured to a large number of classes, and his work in that direction was greatly appreciated by the Council of the Association.

He was President of the Western Australian Branch of the British Medical Association in 1917, and always took a keen interest in the work of the Branch, being a regular attendant at meetings, where he took a keen interest in discussions and contributed many interesting papers on various subjects connected with his specialty.

During the war he gave his services in the London hospitals for the Australian Imperial Force, and attained the rank of major. The severity of the English winter, however, caused bronchitis, and he returned to Western Australia with his health considerably impaired.

He always held the view that many years' experience in general practice was essential to qualify as a specialist and deplored the present day tendency to specialize without that knowledge and experience.

In private life he did not take much interest in sport, but for some years he was a member of the Royal Perth Yacht Club, and attained the rank of commodore. He owned a motor launch and was very fond of fishing, and delighted to entertain his friends on many excursions outside the harbour, and proved himself a genial host.

During the later years of his life he took a great interest in photography and produced many artistic works which received warm commendation in competitions where they were exhibited.

He had a great hobby for carpentry and cabinet making, and installed a workshop at his home, replete with tools and machinery of every description, where he spent his leisure time fashioning beautiful pieces of cabinet work for his home and as gifts for his friends.

He was a great lover of home life, and of recent years, owing to failing health, did not take much part in social affairs. A few years ago he had a serious heart attack with anginal symptoms, and confided to me afterwards

that his working days were numbered. He continued his professional work, however, most cheerfully, and was always ready to help a colleague when called upon to assist in serious cases.

For twenty years we assisted one another in our surgical work and I learnt to appreciate his thorough practical knowledge and skill, and enjoyed his genial and cheerful disposition.

He was beloved of his patients and by all the nurses who worked with him. He had a keen sense of humour and was full of anecdote, telling a story in his own quaint way with the musical voice so characteristic of Welshmen, which endeared him to all.

I never remember him saying one unkind word about his fellow practitioners, and he was ever loyal to the profession that he loved so much.

He leaves a widow and daughter to mourn his loss.

He contracted pneumonia after attending the funeral of a patient, and the end came in a few days. He was of a type of professional man that is fast disappearing, and we deplore his passing and extend our sincerest sympathy to his bereaved ones.

FRANCIS ALEXANDER BENNET.

DR. FRANCIS ALEXANDER BENNET, whose death was recorded in a recent issue of this journal, was born at Cullen, Banffshire, Scotland, in 1856. He was the son of the late Francis Bennet, and went to school at Fordyce Academy, Banff, Scotland. He became an undergraduate at Aberdeen University and graduated first of all in arts. He became a Bachelor of Medicine and Master of Surgery in 1884 and a Doctor of Medicine in 1888. After his arrival in Australia Bennet received a resident appointment at the Bairnsdale District Hospital in 1899. He came to Sydney in 1892 and started practice in College Street. His general practice grew steadily as a result of the sympathetic care that he gave his patients and of his understanding of human nature. He became interested in diseases of the skin and served as honorary dermatologist at the Sydney and Royal Prince Alfred Hospitals. Students of twenty-five years ago will remember with pleasure the lessons they learned from him. He had an inimitable way of handling his patients, and his demonstrations were always full of interest. He held the lectureship in diseases of the skin at the University of Sydney and relinquished it in 1911. For many years before his death he lived in retirement and interested himself in pastoral pursuits. Thus he was not known to many members of the younger generation. He is survived by his widow, one son and three daughters.

Dr. Cedric V. Bowker writes:

Frank Bennet had a remarkable personality. It would have commanded success in any path of life and was peculiarly suitable for the profession of a physician. With a jovial face, with keen, shrewd, sparkling eyes, and a wonderful bedside manner, he had, apart from his specialty, a very large general practice amongst all classes, and he was sadly missed by his patients when he retired. His visits and breezy presence often did more to cheer a drooping soul than an octave of drugs. No one possessed more than he the faculty of pampering and cajoling when necessary, but no one could be more earnest in a serious case, and he was always keenly solicitous for the welfare of his patients. He possessed a deliberative mind, a great memory, and great business acumen and so his advice in general matters was much sought after by friends and acquaintances. He was a tremendously busy man and his recreation used to be a walk after finishing his afternoon's work with some friend or other, by whom the privilege was always much appreciated. About the most apt description of him was one from an old lady patient who used to say that he exuded happiness all over—this indeed described the absolute spontaneity of bright personality. Professional skill and experience can be replaced, but not readily such charm of manner and personality as possessed by Frank Bennet. He will be missed by many as a true friend and a wise counsellor.

Dr. E. H. Molesworth writes:

As a student and resident at Royal Prince Alfred Hospital from 1904 to 1908, the writer was thrown into intimate contact with the late Dr. Bennet, especially as a senior resident, the X Ray Department being always in close touch with the Skin Department.

In diagnosis the rapidity of Dr. Bennet's observation was remarkable. He had had such a long experience of all diseases of the skin that almost in a single glance he could recognize the particular malady presented to him. A few shrewd questions confirmed or modified his preliminary diagnosis, and it was an extreme rarity for him to be in error. Again, the nimbleness of his mind was shown by the speed with which he decided upon the line of treatment to be followed.

But most of us remember how he could, like Napoleon, use his mind in three directions. Dr. Bennet could listen to a student's questions about the case, write a prescription, and give the patient instructions at one and the same time.

His good humour was never ruffled, and he had the inimitable quality of inspiring his patients with that fullest confidence which reacts so favourably towards a cure.

As to his capacity and willingness to help a very junior colleague in difficult cases, the writer can answer personally and with great gratitude. Especially was this help valuable in supplying suggestions as to the treatment of the case put to him. He was a past-master in the use of remedies employed in dermatology and recognized almost by intuition the indications for the different varieties of treatment recommended for a particular malady.

He was acutely conscious of the necessity for avoiding irritation by treatment, and of the irritative capacity of antiseptics. A piece of advice he frequently gave was: "If you find your dressing irritates an eczema, don't lose a minute in substituting a soothing application."

Dr. Bennet's name and personality will remain very long in the memories of his colleagues in dermatology in Australia, and his never-failing kindness and optimism will be sadly missed by all who knew him.

PHILIP ALOYSIUS PARER.

WE regret to announce the death of Dr. Philip Aloysius Parer, which occurred on October 15, 1931, at Kew, Victoria.

The Royal Australasian College of Surgeons.

A MEETING of the Council of the Royal Australasian College of Surgeons was held at Melbourne on September 27, 1931.

The following candidates were admitted as Fellows:

England: Lambert Charles Lambert.

New South Wales: George Moncrieff Barron, Bernard Brooks Blomfield, Cecil Richard Blomfield, Albert Tange Dunlop, William Alexander Dunn, Thomas Maynard Furber, Richard Guy Septimus Harris, John Walwyn Shepheard Laidley, Brooke Moore, Gerald Keith Smith, Walter Jaques Stack, Cecil Julian Manning Walters.

New Zealand: Howard Vincent Coverdale, James Keith Davidson, Thomas Fergus, Rupert Selwyn Australia Graham, Walter James Hope-Robertson, Tracy Russell Tracy-Inglis.

Queensland: Hedley James Brown, Walter Lockhart Gibson, Charles Mitford Lilley, John Joseph Power, Neville Graham Sutton.

South Australia: Lionel Oxborrow Betts, Walter John Westcott Close, Robert McMahon Glynn, Owen Meredith Moulden, Harold Keith Pavy, Laurence Algernon Wilson.

Victoria: Francis Florence D'Arcy, George Ronald Davidson, William Raymond Dudley Griffiths, Kenneth Howard Hadley, Charles Hugh Hembrow, Raymond Valentine Hennessy, Norman Anderson Longden, Thomas Glass Millar, Julian Smith, Junior.

Western Australia: Reginald Dalton McKellar Hall, Claude Morlet.

The following candidates were admitted as Junior Members:

New South Wales: Clifford Stirling Colvin, Thomas Dixon Hughes, Louis Samuel Loewenthal, John Stephen MacMahon, Henry Bruce Williams.

Correspondence.

GOITRE.

SIR: In the hope that more conservative treatment may be employed before operation is resorted to in goitres, I am enclosing a letter recently received from Colonel R. McCarrison, whose life's work on goitre is probably known to many. I feel sure that he would not have the slightest objection in my using it, as he is as anxious as I am to see the day when operation is only resorted to in the extreme cases. His forceful support of opinions I have been putting forward for the last twenty years must surely help to carry some weight.

Yours, etc.,

SYDNEY PERN.

12, Collins Street,
Melbourne,
September 28, 1931.

Dear Dr. Pern,

I found your letter of the 15th August awaiting me here on my return two days ago from leave in England. I hasten to thank you for it and for your interesting reprint which you so kindly sent me. The reprints on the subject of goitre which you have sent me from time to time are by no means forgotten, and they have their places on my files. I am glad you have stuck out against the generally accepted opinion that goitre was due to lack of iodine, and I am interested to hear of your successful cures of the condition by the removal of the focal infections. I am quite sure that where men have failed to cure goitres, they have overlooked some focus of infection somewhere.

I send under separate cover, reprints of the two lectures which you have found interesting, and I hope you will accept them with my very kind regards.

Yours sincerely,

R. McCarrison.

CANCER EDUCATION: THE UNIVERSITY CAMPAIGN.

SIR: During the last five years the University of Sydney, in its administration of the Cancer Fund subscribed by the public, has done a large amount of effective pioneer work in the encouragement of cancer research, in the provision of facilities for cancer treatment and in the education of the public.

In the light of experience gained in the handling of large numbers of cases of malignant disease at hospitals, it has become evident that more favourable results can be obtained if the public can be persuaded to consult their medical advisers earlier and more frequently in regard to signs and symptoms of the clinical importance of which they are unaware. The University, therefore, has given its authority for the prosecution of an educational campaign throughout New South Wales, in the hope of diminishing cancer mortality and alleviating suffering.

By the issue of leaflets, for distribution by pharmacists and others, by newspaper articles, cinemas, broadcasting, public notices and other agencies, it will impress upon the people of the State the danger of delay and the necessity of seeking skilled advice. It does not wish to produce a cancer phobia, but rather a cancer consciousness. It wishes to awaken in the minds of the people an active interest in their individual health and to encourage them to have regard to malignant disease, not in a spirit of dismal fatalism, but rather in a spirit of sober optimism.

This letter is written by request in the hope that the medical profession will give its encouragement to this movement and cooperate with the University for the public benefit.

Yours, etc.,

F. P. SANDES,
Director of Cancer Treatment.

The University of Sydney,
October 19, 1931.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on October 12, 1931.

The degree of Bachelor of Medicine was conferred *in absentia* upon Noel Francis Balzer.

An invitation was received from the University of Caen asking the Senate to send a representative to the celebration of the 500th anniversary of that University, to be held in June, 1932.

It was decided that evening lectures in science should be suspended as from the beginning of 1932.

It was decided to award the degree of Doctor of Dental Science to Mr. W. J. Wearn, B.D.S., for his thesis entitled "Cleft Palate." The examiners reported that the thesis was one of outstanding merit, contributing to the knowledge and understanding of dental science, and a work likely to obtain world-wide recognition and become the routine in all cases of cleft palate. (Mr. Wearn graduated Bachelor of Dental Science of Sydney University in 1923.)

It was decided to award the degree of Doctor of Medicine to Mr. Michael Richard Flynn, B.A., B.Sc., M.B., Ch.M., for his thesis entitled "Injury to the Common Duct and Its Effects upon the Hepatic Ducts and Liver." The Faculty of Medicine considered the thesis a contribution of distinguished merit, adding to the knowledge of experimental surgery and pathology. (Mr. Flynn graduated Bachelor of Arts in 1914, Bachelor of Science in 1916 with first class honours in Zoology, Bachelor of Medicine in 1919 with first class honours, and Master of Surgery in 1920.)

It was decided to award the degree of Doctor of Medicine to Mr. John Kempson Maddox, M.B., Ch.M., for his thesis entitled "Renal Dwarfism," which the Faculty of Medicine considered an original contribution of distinguished merit, adding to the knowledge of medicine. (Mr. Maddox graduated Bachelor of Medicine and Master of Surgery in 1924 with second class honours.)

On the recommendation of the Faculty of Medicine, it was decided that the teaching in pathology be commenced one clear fortnight before "lectures begin" in Lent term of the fourth year, and that all deferred examinations in connexion with the third degree examination be definitely completed before that fortnight opens.

It was resolved that four Honorary Assistant Clinical Tutors in Medicine be appointed at the Royal Prince Alfred Hospital, three at Sydney Hospital, and one at Saint Vincent's Hospital.

It was decided to approve the recommendation of the War Memorial Committee that two permanent Rolls of Honour under the archway of the Great Tower be unveiled by His Excellency the Governor at 11.45 a.m. on Armistice Day, November 11, 1931.

Diary for the Month.

OCT. 27.—New South Wales Branch, B.M.A.: Medical Politics Committee.
OCT. 28.—Victorian Branch, B.M.A.: Council.
OCT. 29.—South Australian Branch, B.M.A.: Branch.
OCT. 29.—New South Wales Branch, B.M.A.: Branch.
NOV. 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
NOV. 5.—South Australian Branch, B.M.A.: Council.
NOV. 6.—Queensland Branch, B.M.A.: Branch.
NOV. 10.—New South Wales Branch, B.M.A.: Ethics Committee.
NOV. 11.—Victorian Branch, B.M.A.: Branch.
NOV. 12.—New South Wales Branch, B.M.A.: Clinical Meeting.
NOV. 12.—Victorian Branch, B.M.A.: Council.
NOV. 13.—Queensland Branch, B.M.A.: Council.
NOV. 17.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
NOV. 24.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Medical Appointments.

Dr. A. W. L. Row (B.M.A.) has been appointed Honorary Consulting Surgeon to the Hospital for Insane, Willowburn, Queensland.

* * *

Dr. V. R. Woodhill (B.M.A.) has been appointed Honorary Consulting Physician to the Hospital for Insane, Willowburn, Queensland.

* * *

Dr. J. F. Gaha (B.M.A.) has been appointed to the Mental Deficiency Board as a nominee of the Council of the University of Tasmania, pursuant to the provisions of Section 39 (2), III, of the *Mental Deficiency Act*, 1920.

* * *

Dr. H. McI. Birch (B.M.A.) has been appointed Acting Deputy Superintendent of the Parkside Mental Hospital, South Australia.

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Dr. G. F. Lumley has been appointed Temporary Medical Officer, Quarantine Division, New South Wales, Watson's Bay.

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Dr. E. J. T. Thompson (B.M.A.) has been appointed Acting Inspector-General of the Insane, Acting Medical Superintendent, Claremont Hospital for the Insane, "Lemnos," Greenplace, "Heathcote," and Whitby Falls, and Acting Inspector-General of Institutions for Inebriates, Western Australia.

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Dr. D. L. G. Thomas (B.M.A.) has been appointed Government Medical Officer at Narooma, New South Wales.

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Dr. K. E. Phipps has been appointed Government Medical Officer at Tullibigeal, New South Wales.

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Dr. S. G. Stevens (B.M.A.) has been appointed Medical Officer, Department of Mental Hospitals, New South Wales.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi.

LAUNCESTON PUBLIC HOSPITAL, TASMANIA: Medical Superintendent.

RACHEL FORSTER HOSPITAL FOR WOMEN AND CHILDREN, SYDNEY, NEW SOUTH WALES: Honorary Surgeon to Out-Patients (female), Temporary Assistant Medical Registrar (female).

ROYAL NORTH SHORE HOSPITAL OF SYDNEY, NEW SOUTH WALES: Pathologist.

THE BRISBANE AND SOUTH COAST HOSPITALS BOARD, QUEENSLAND: Honorary Vacancies.

THE UNIVERSITY OF MELBOURNE, VICTORIA: Lectureship in Venereal Diseases.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members desiring to accept appointment in ANY COUNTRY HOSPITAL, are advised to submit a copy of their agreement to the Council before signing, in their own interests. Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Mines. Toowoomba Associated Friendly Societies' Medical Institute.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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